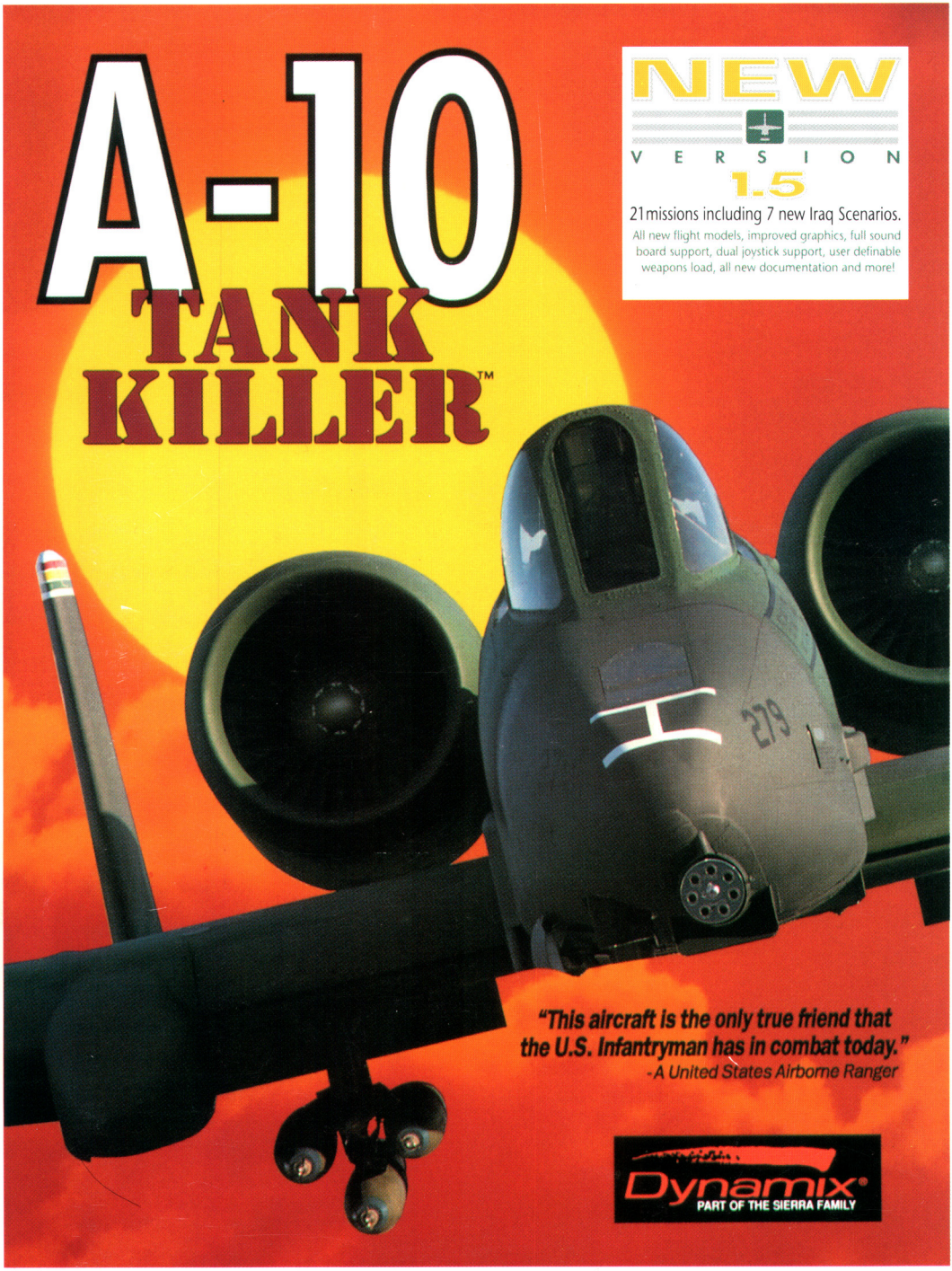
A-10
TANK KILLER™
NEW
VERSION
1.5
21 missions including 7 new Iraq Scenarios.
All new flight models, improved graphics, full sound board support, dual joystick support, user definable weapons load, all new documentation and more!
279
"This aircraft is the only true friend that the U.S. Infantryman has in combat today."
-A United States Airborne Ranger
Dynamix®
PART OF THE SIERRA FAMILY

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Credits

A-10 Tank Killer

Version 1.0

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Version 1.5

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Sound Effects ..... Christopher Stevens
Audio Director ..... Alan McKean

A-10 Tank Killer
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Dynamix, Inc.

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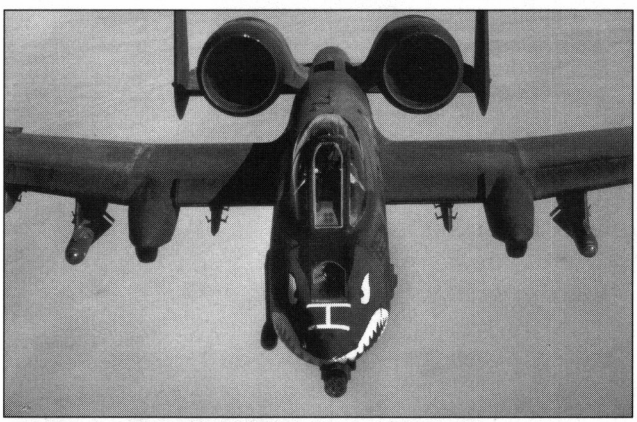

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Maj. Chuck "Hollywood" Temple, USMCR
Oregon Air National Guard
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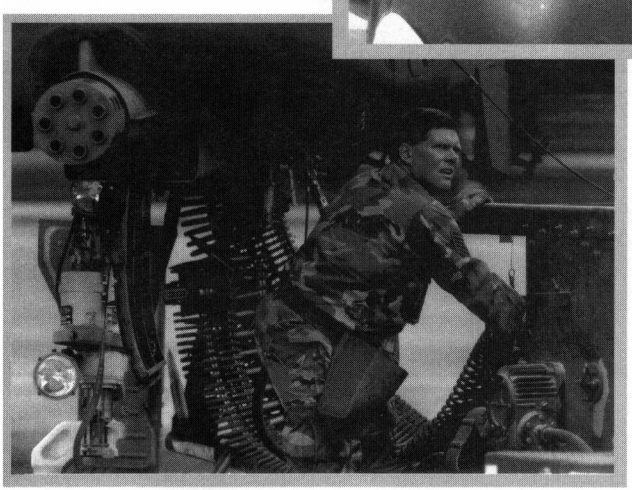
Technical

Bettman Archive



Ted Jackson/*New Orleans Times Picayune*

Technical (MS-DOS)

MS-DOS Installation Procedure for A-10 Tank Killer

Smart Start™

In an effort to make game installation as painless as possible, we've created Smart Start™. Smart Start™ will automatically determine the graphics, sound, input devices and speed capability of your computer system to optimize game characteristics. Smart Start™ will also take you step-by-step through the process of installing your game on a hard drive or making a backup copy. Don't be intimidated, just jump in and try it!

In the example below, it is assumed that you are using floppy drive A. If not, please substitute all references to drive A with the appropriate drive label.

Copying A-10 Tank Killer to a Hard Drive

1. After booting, insert A-10 Tank Killer disk #1 in Drive A
2. Type **A:** (ENTER)
3. Type **INSTALL** (ENTER)
4. Select "**Copy A10 to Hard Drive**" from the Smart Start™ menu
5. Follow the on-screen instructions

Making a Backup Copy

A-10 Tank Killer is not copy protected. We recommend that you do not play from the original disks. Smart Start™ has a built-in facility for helping you create a backup copy.

1. After booting, insert A-10 Tank Killer disk #1 in Drive A
2. Type **A:** (ENTER)
3. Type **INSTALL** (ENTER)
4. Select **"Make a backup copy"** from the Smart Start™ menu
5. Follow the on-screen instructions

Setting Preferences

Smart Start™ will do its best in deciding what type of computer equipment you have, but sometimes it may make a mistake or you may wish to try other graphics modes, sound configurations, etc. To modify Smart Start™ preferences, follow these steps:

1. **From a floppy disk:** insert A-10 Tank Killer disk #1 and type: **A:** (ENTER)
   From a hard drive: go to the A-10 directory on your hard drive
2. Type **INSTALL** (ENTER)
3. Select **"Change Graphics"** or **"Change Sounds/ Music"** from the Smart Start™ menu
4. Follow the on-screen instructions

To run the game, type "A10" from the A-10 Tank Killer hard disk directory or floppy disk #1.

Technical (AMIGA)

Amiga Installation Procedure for A-10 Tank Killer

The following are instructions for installing A-10 Tank Killer onto a hard disk and booting the system. Both can be done from either the Workbench or the CLI. In the instructions we assume that you are using floppy drive DF0: and hard drive DH0:. If your drives go by different names, replace the drive label in the example with the correct one. For example, if you have an Amiga 3000, you will probably need to replace DHO: with WORK:.

Copying A-10 Tank Killer to a Hard Drive

1. Boot your system.
2. Insert A-10 Disk #1 into the first internal floppy disk drive.
3. From Workbench, double click on the A10 #1 icon and then on the Install icon.
   From the CLI, type **CD DF0:** and press (↵) Then type **INSTALL** and press (↵)
   The Dynamix Install Utility window will appear.
4. Choose which drive and directory you wish to install the program to. The default is: DH0: DYNAMIX/A10. To change the path, click on the Destination Directory default path and type in the new one.
5. Click on the **INSTALL** button.
6. At the prompt, click on the **OKAY** button to install the program files. To cancel the installation process, click on the **CANCEL** button.

Note: If you are using backup disks that were copied using the Workbench, you must rename the copies of the game disks to remove the words "copy of" from the disk label. If the words "copy of" are not removed, you will be unable to use the hard drive installation program.

Amiga Loading Instructions

From Floppy Diskettes

Note: You may run the A-10 program from multiple floppy drives.

Self-Booting
1. Insert A-10 Disk #1 into drive DF0:
2. Turn on the system.

From Workbench
1. Boot your system with Workbench.
2. Insert A-10 Disk #1 into a disk drive.
3. Double click on the A10 #1 disk icon.
4. Double click on the A10 icon.

From the CLI
1. Boot your system with the CLI.
2. Insert A-10 Disk #1 into floppy drive DF0:
3. Type **CD DF0:** and press (↵)
4. Type **A10** and press (↵)

From a Hard Disk

From Workbench
1. Load Workbench.
2. Double click on the hard disk icon.
3. Double click on the Dynamix drawer.
4. Double click on the A10 drawer.
5. Double click on the A10 icon.

From the CLI
1. Load a CLI window.
2. Type **CD DH0:DYNAMIX/A10** and press (↵)
3. Type **A10** and press (↵)

Troubleshooting

Problem: *My computer has at least 640K of memory, but I receive a message saying there is not enough memory to run A-10 Tank Killer.*

Possible Solution: A-10 Tank Killer requires at least 570K of free memory. Your computer may be running a "pop up" (TSR) program or it may be connected to a device such as a LAN that uses a portion of the memory. In order to run A-10 Tank Killer, you will need to free up some of the computer's memory or select a different graphics mode from the Smart Start™ (Install) program.

Problem: *The joystick is not working properly.*

Possible Solution: Press **ALT-C** to calibrate the joystick.

Problem: *When playing from the keyboard, strange things happen such as the cursor moving all around the screen.*

Possible Solution: Press **ALT-J** to turn off the joystick or **ALT-D** to disengage the mouse. Also, joystick calibration, **ALT-C**, may alleviate the problem.

Problem: *Constantly playing music bugs me, but I still want to hear sound effects.*

Possible Solution: Press **ALT-M** to turn off the music or select "music off" from the Preferences Menu.

Problem: *Graphics appear in a mode that I don't want.*

Possible Solution: Use Smart Start™ to select the type of graphics you desire. Also check the original package to see if you are running a version of A-10 Tank Killer that contains the graphics mode you are trying to select.

Problem: *When I run the program I get multiple small images or complete garbage on the screen.*

Possible Solution: You are probably using a VGA card which is not 100% register compatible. Select a different graphics option from Smart Start™.

Amiga Specific Notes:

1. A-10 does not multi-task with other programs. Make sure no other programs are running when you start A-10.
2. Although your system may have one megabyte of memory, you still may not have enough available memory to run A-10 Tank Killer. Self-booting the program from disk should provide you with enough free memory to run the program. NOTE: Memory allocated for hard disk partitions or resident programs will reduce the amount available for running programs.

Sgt. John Gray Andy Clark/Bettman Archive

Dynamix/Sierra Customer Support
P.O. Box 485
Coarsegold, CA 93614

(209) 683-8989
8 A.M. TO 5 P.M. (PT) Monday through Friday

If you have a problem that is not addressed in this manual, please call or write our Customer Support Line.

Disk Problems

TECHNICAL HELP (MS-DOS ONLY)

If you are having problems with your game disks, please review the following section before assuming the disks are faulty:

If you receive any of the following messages:

1. "**Insert Disk (#)**" (when you have already inserted that disk, or if you are playing the game from a hard drive)
2. "**Unable to Chain**"
3. "**Disk Error**"

Or, if the game locks up at any point, you may need to re-install the game or you may have memory resident programs loaded into RAM. If after re-installing the game the problem still persists, you will need to boot your system from a disk containing your operating system only. Follow the instructions below to create a "Dynamix Boot Disk" (a disk that contains only the operating system).

Formatting from a Hard Drive

A) Place a blank disk in drive **A**.
B) At the **C** prompt, type: **FORMAT A:/S**.

NOTE: If your **A** drive is a high-density drive and you are using double density disks, you will need to type: **FORMAT A:/4/S** (for 5.25"disks) *or* type: **FORMAT A:/N:9/T:80/S** (for 3.5" disks).

Formatting from a Diskette Drive

A) Place your DOS disk in drive **A**.
B) At the **A** prompt, type: **FORMAT A:/S** (be sure to switch to a blank disk when prompted by the FORMAT program).

NOTE: If your **A** drive is a high density drive and you are using double density disks, you will need to type: **FORMAT A:/4/S** (for 5.25" disks)
or type: **FORMAT A:/N:9/T:80/S** (for 3.5" disks).
C) Press ENTER
D) Respond to the DOS prompts.

Now you should create a CONFIG.SYS file on your Dynamix Boot Disk, with a files=20 statement. Follow these instructions to create this file:

A) Type: **A:** ENTER
B) Type: **COPY CON CONFIG.SYS** ENTER
C) Type: **FILES=20** ENTER
D) Press **F6** ENTER

You should see the message: "**1 File(s) copied.**" You will now have to re-boot your computer with your new Dynamix Boot Disk in the drive. Turn your computer off, then on, or press **Ctrl-Alt-Del**.

If booting your computer with your new Dynamix Boot Disk doesn't clear up the problem you are encountering, our technical staff will be happy to help you.

TECHNICAL HELP (ALL SYSTEMS)

Technical assistance is only a telephone call away. Call (209) 683-8989, 8 A.M.- 5 P.M. Pacific Time for convenient, person-to-person service. Or if you prefer, you may request assistance by mail. If you choose to write to us with your request, please state your computer type and the nature of your problem.

If you find that you need to send for replacement diskettes, send the original disk #1 in the size you need (3.5" or 5.25") to:

Sierra On-Line
P.O. Box 485
Coarsegold, CA 93614
Attention: RETURNS

Be sure to include a note stating your computer type, and the size of diskette you need (5.25" or 3.5"). We will gladly replace your program free of charge for the first 90 days of ownership (please enclose a copy of your dated sales receipt with your request). After 90 days there is a $5.00 charge for 5.25" diskettes and a $10.00 charge for 3.5" diskettes.

Controls & Simulations

Lt. Isenstadt

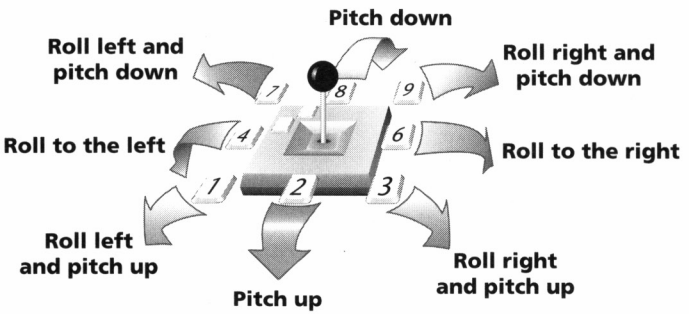
George Hall

Flight Controls

Movement

You use the control surfaces and the throttle to maneuver the A-10. The control surfaces include the ailerons, the elevators, the rudder and the throttle. A-10 Tank Killer Version 1.5 supports an optional second joystick as detailed in the following sections. From the Control menu, you may select which peripherals you have attached. You may select: keyboard, joystick and mouse control.

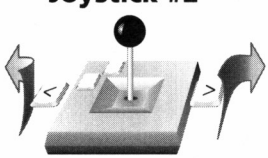
The mouse is self-centering and will automatically recenter itself after each movement command.



Rudder

The rudder can be controlled from either the keyboard or second joystick.

Joystick #2



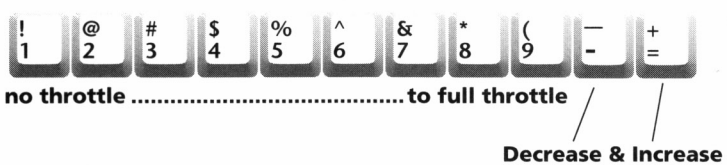
Keyboard

< left rudder

> right rudder

Throttle

The throttle can only be controlled from the keyboard.



Weapons Control

Joystick #1

Button #1 = Fire Avenger Cannon
Button #2 = Fire Selected Weapon

IMPORTANT!
When the Floating Camera is ON, firing the **Selected Weapon** is possible ONLY with the BACKSPACE key. See page 18 for details on Floating Camera.

Joystick #2

Button #1 = Chaff Release
Button #2 = Flare Release

Mouse controls for weapon firing are identical to those of the joystick.

Joystick #1		*Mouse*
Button #1	=	Left Button
Button #2	=	Right Button

Keyboard

SPACEBAR = Fire Avenger Cannon

BACKSPACE = Fire Selected Weapon

ENTER = Fire Selected Weapon or control Floating Camera view

Weapons Select

H Maverick	L Durandal	C Release Chaff
J LGB	; Sidewinder	[ ] Weapons Cycle
K Rockeye	F Release Flare	Tab Target Cycle

Additional Controls

G **Landing gear up/down**	Esc **Quit mission requestor**
P **Pauses game**	Alt M **Music on/off**
M **Bring up strategic map**	Alt S **Sound effects on/off**
S **Bring up status screen**	Alt J **Joystick(s) on/off**
D **Display message log**	Alt C **Calibrate joystick(s)**
Q **Quit mission requestor**	Alt D **Mouse on/off**
F10 **Display control menu**	Alt Q **Quit to DOS**

View Commands

While in the heat of battle, it's always important to remain aware of the situation around you. Learning to quickly switch between different viewpoints will greatly increase your chances for survival.

Preset Views

Cockpit		External	
F1	Look Forward	**F4**	Front View
F2	Look Left	**F5**	Left Side View
F3	Look Right	**F6**	Right Side View
		F7	Rear View
		F8	Victim View
		F9	Engagement View

Floating Camera Views

Along with preset side and external views, A-10 Tank Killer Version 1.5 also allows you to activate a *floating camera* that will enable you to move the viewpoint around and away from your aircraft.

IMPORTANT: With the activation of the floating camera, ONLY the *Backspace* key (not *Enter*) can fire the selected weapon.

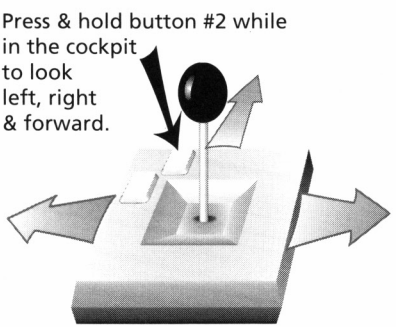
Use **Alt - V** on the keyboard or the Control menu (**F10**) to toggle the Floating Camera on/off.

Controlling the Floating Camera with the joystick

Once the floating camera has been switched on, you may control the current view without touching the keyboard.

From Within the Cockpit

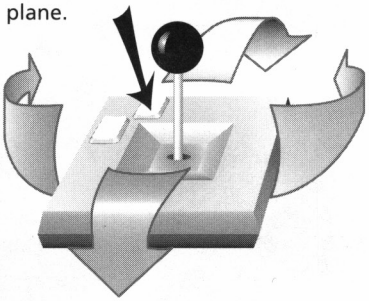
Holding down **button #2** and moving the joystick forward will switch to Look Forward (**F1**), to the left will switch to Look Left (**F2**), etc. Pressing and releasing **button #2** with the joystick centered will switch from the cockpit to the outside rear view.



From Outside the Aircraft

Holding down **button #2** while moving the joystick will pan the view smoothly around the aircraft: moving the joystick to the left will pan the view clockwise around your aircraft, moving the joystick forward will pan the view up around the aircraft, etc. Holding down both buttons while moving the joystick forward/backwards will move the camera closer to or away from the aircraft. Pressing and releasing **button #2** with no joystick movement will switch to the front cockpit view.

Press & hold button #2 while outside to move viewpoint around plane.

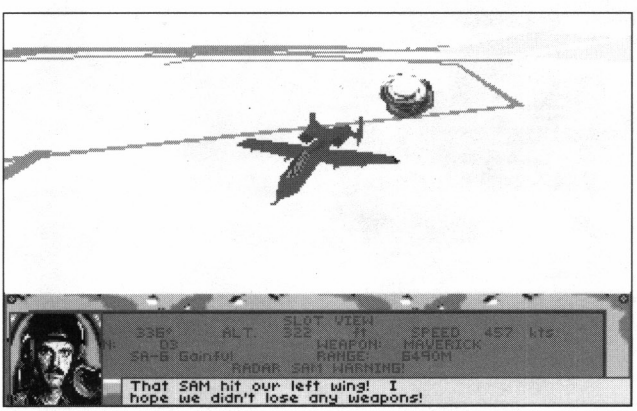


Controlling the Floating Camera From the Keyboard

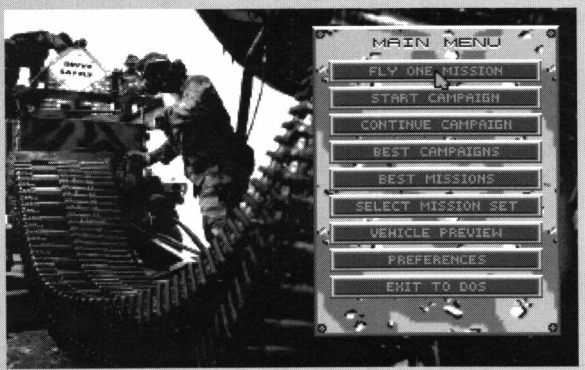
The previously described commands may be duplicated without a joystick: the keyboard **numeric keypad** will function like the joystick, the **Space Bar** will function like **button #1** and the **Enter** key will function like **button #2**.

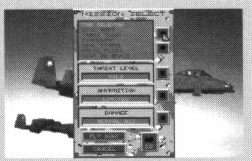
Mouse controls for view commands are identical to those of the joystick.

Joystick #1		***Mouse***
Button #1	=	Left Button
Button #2	=	Right Button



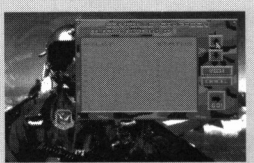
Game Overview





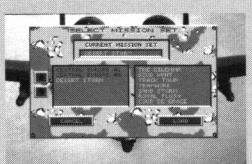
Fly One Mission

Start Campaign



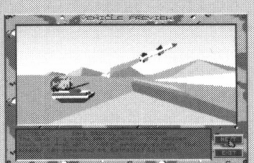
Continue Campaign

Welcome to A-10 Tank Killer. To make learning the game as quick and easy as possible, the following overview is offered. It is a quick guide to the menu system and game play. An in-depth description follows this introduction which provides a detailed explanation of each screen.



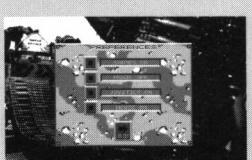
Select Mission Set

Best Campaigns

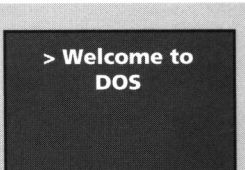


Vehicle Preview

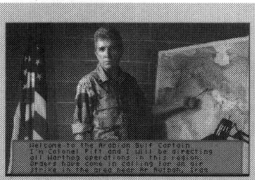
Best Missions



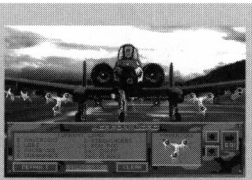
Preferences



Exit to DOS

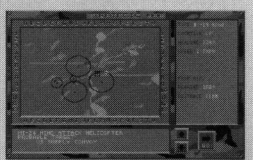


Briefing

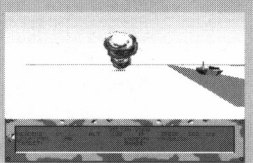


Weapon Load

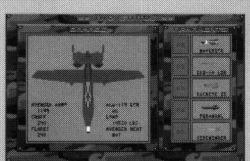
Simulation



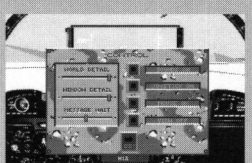
Strategic Map



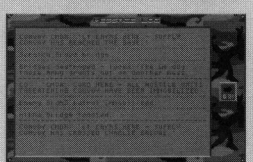
Preset Views



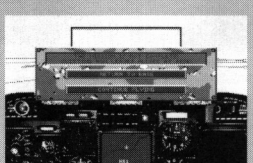
A-10 Status



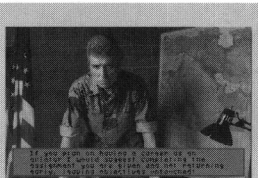
VCR Interface™



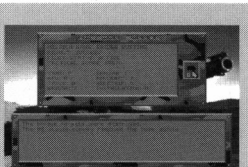
Message Log



Quitting



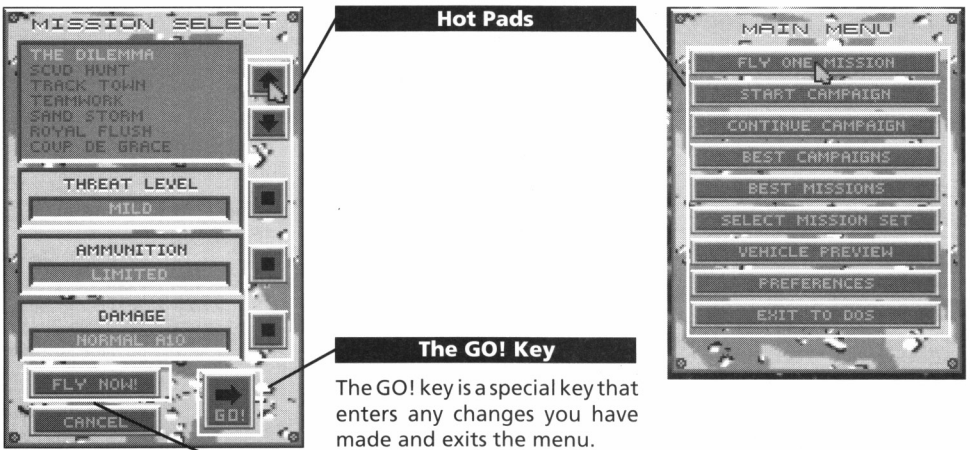
Debriefing



Mission Summary

Menu Controls

The menu system for A-10 Tank Killer was designed to be intuitive and easy-to-use for both novice and advanced users. The following are a few simple tips and instructions that explain basic menu use.



Mouse, Joystick or Keyboard Control

The on-screen arrow can be moved by mouse, joystick or keyboard.

Mouse

To select **Hot Pad**: Move mouse to position arrow on **Hot Pad** and press either mouse button to select.

Joystick

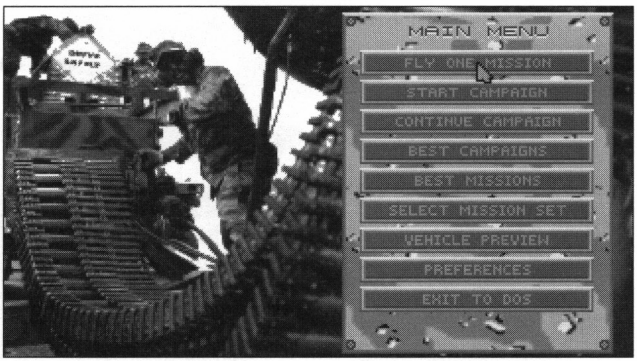
To select **Hot Pad**: Move joystick to position arrow on **Hot Pad** and press either joystick button to select.

Keyboard

To select **Hot Pad**: Press the **TAB** key to move the arrow from one **Hot Pad** to another. Press the **SPACEBAR** to select.

Main Menu

The first menu screen is the Main Menu. It is the starting point from which you enter the game.

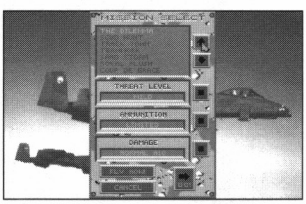


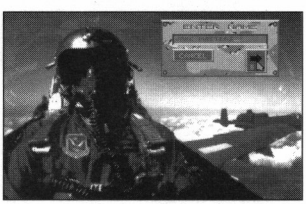
Among the nine menu choices on the **Main Menu** are **Fly One Mission** and **Start Campaign**. These are the two modes of game play that A-10 Tank Killer offers.

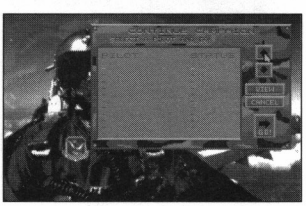
Fly One Mission allows you to individually select which mission to fly. Each mission includes a Briefing/Debriefing, Weapons Select (except Scramble missions) and Mission Summary. When a mission is completed or exited, you will be returned to the **Main Menu**.

Start Campaign enters you into a preset "tour of duty." You will start at mission #1 of the selected mission set and continue until you have either completed all of the missions in the set, are shot down or lose the war. A key element of Campaign Mode is that goals, objectives and key players are carried over from one mission to the next. In Campaign Mode, if you do poorly in the first mission, it may come back to haunt you. Also important in Campaign Mode is that campaigns can be saved for later continuation. When beginning a campaign, you will enter a character name. The campaign will be saved under this name and can later be viewed/continued in **Continue Campaign**.

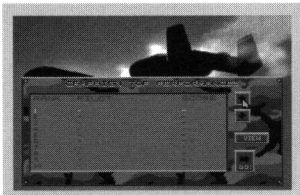
Mission or Campaign?





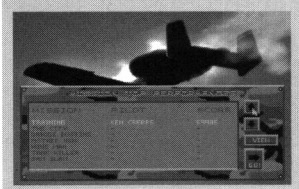


Also available from the Main Menu



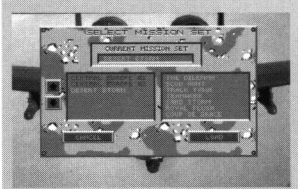
Best Campaigns

Allows you to view the best performances of all Campaign Mode players.



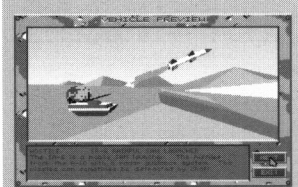
Best Missions

Displays a "Hall of Fame" for best performances on a single mission.



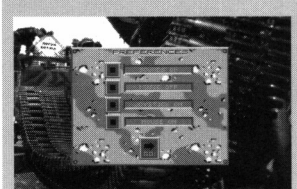
Select Mission Set

Allows you to choose a particular "mission set," each set containing seven missions.



Vehicle Preview

Allows you to preview the weapons and vehicles used by both friendly and enemy forces.



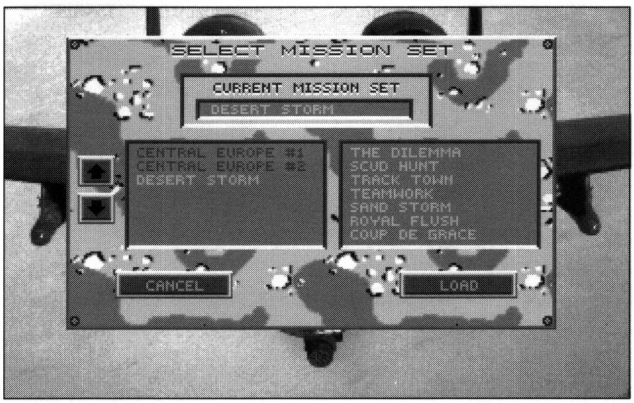
Preferences

Allows you to adjust sounds, music, joystick and mouse.

Exit to DOS

Quits the game and exits to DOS.

Select Mission Set



Choosing **Select Mission Set** from the Main Menu will take you to the **Select Mission Set** menu. Under this menu, you will be able to choose which of the three scenarios you will play under.

Mission Sets

You can select from three mission sets:

Central Europe #1 takes you through basic flight training in Europe and through increasingly difficult missions.

Central Europe #2 places you back into the European theater with missions that are more involved than those of Central Europe set #1.

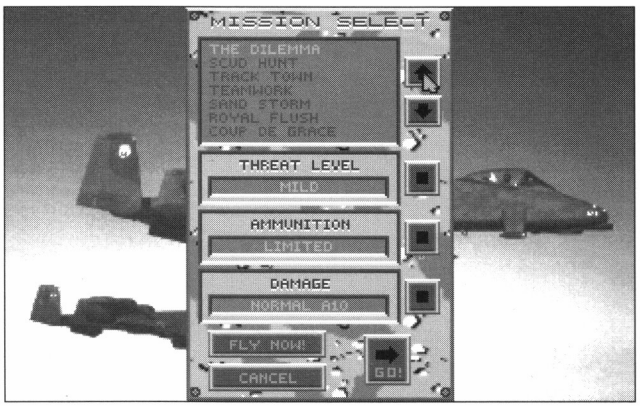
Desert Storm takes you into the war torn period of the Gulf War. You will fly against new enemies and threats in the deserts of the Middle East.

Important!

It's important to note that mission sets are not interconnected. Each set acts as an individual simulation module. Features such as Campaign play, Best Missions and Continue Campaign are all dependent upon which mission set is currently selected.

Mission Select Menu

Choosing **Fly One Mission** from the Main Menu will take you to the **Mission Select** menu. Under this menu, you will be able to select a single mission and tailor its difficulty level and game play parameters to your level.



Threat Level

You can individually tailor the degree of difficulty in each mission.

Mild = Wimp Mode
Moderate = Pretty Mean Suckers
Aggressive = Major Bad News

Ammunition

You may select a "limited" or "unlimited" ammunition supply. On the unlimited setting, the Avenger Cannon will NOT jam due to overheating.

Damage

You may select a "normal" or " invincible" A-10. "Normal" means that your A-10 can be damaged while "invincible" means that your A-10 cannot be damaged and the Avenger cannon will NOT jam.

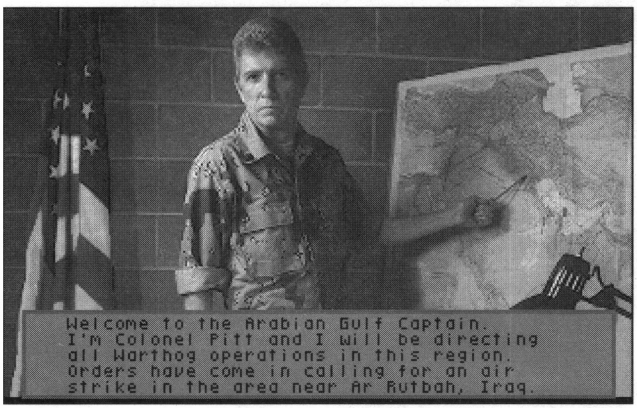
Fly Now!

Selecting the Fly Now! option will take you immediately into simulation play, bypassing both the briefing and weapons load.

NOTE: Scores achieved with selection of either "unlimited" ammunition or "invincible" damage WILL NOT be recorded into the hall of fame. Also, the Avenger Cannon will not be subject to jamming when you are in either "unlimited" or "invincible" modes.

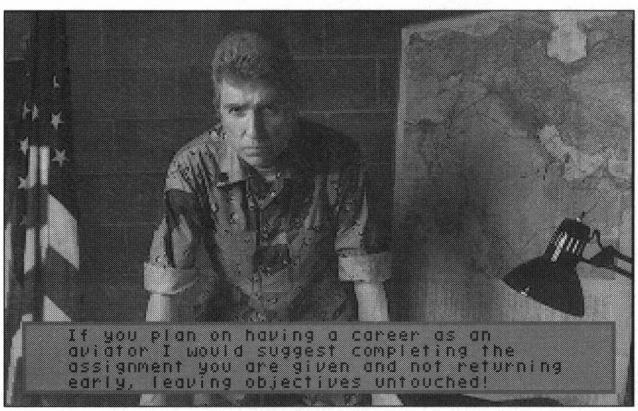
Briefing / Debriefing

Meet your commanding officer. He's full of advice, wisdom and orders. You will meet with him before and after each mission. In the briefing, he will instruct you as to the current situation and give you your orders. Of course, once airborne you and your co-pilot are free to do as you wish. REMEMBER: You'll have to answer to your CO in debriefing, assuming you make it back alive.



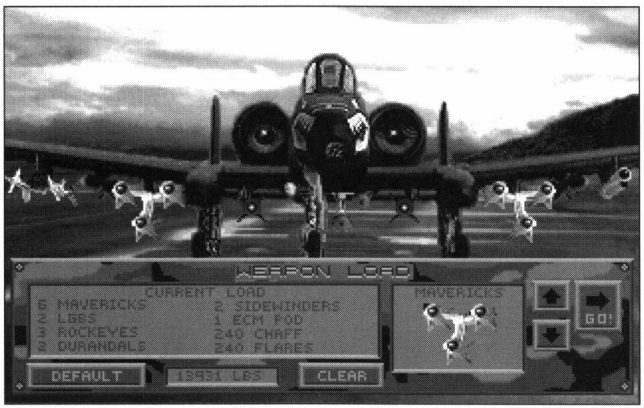
Mission Briefing

NOTE: Pressing the **SPACEBAR** or **either joystick button** will quickly advance to the next text box. Pressing the **ESC** key will bypass the briefing/debriefing completely.



Mission Debriefing

Weapons Load



The final screen you will encounter before entering the simulation will be Weapons Load. You may choose the default load (custom tailored for the individual mission) or you may *build* your own by individually filling the load pylons on the A-10. The default load is based upon the specific goals of each mission and will, for the most part, prove most effective. However, as you play each mission and develop your own strategy, you may find that selections other than the default are more useful. (**See Weapons Systems, page 45.**) Pressing the Clear button will erase the current weapon load.

Weapon Selection

Copy Placed Weapon Keys
Enter
Joystick #1 button #2
Right Mouse button

Place Weapon Keys
Spacebar
Joystick #1 button #1
Left Mouse button

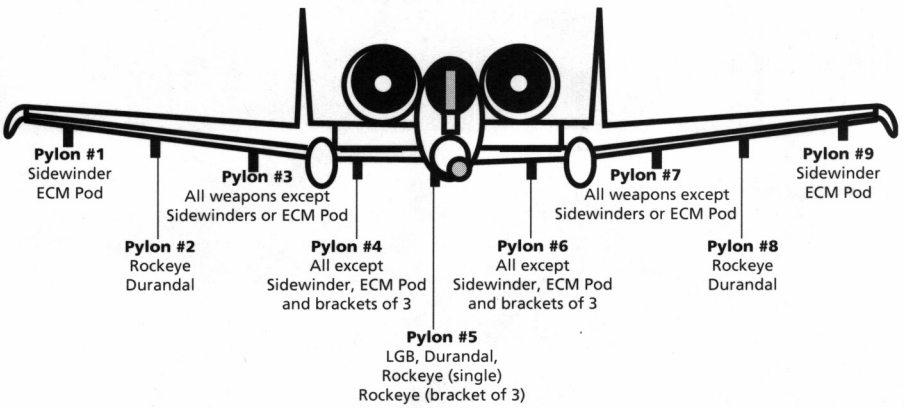
For custom weapon loads, you'll need to select the desired weapon and designate its placement on the pylons of the A-10. To load a weapon:

1. **Press the up and down arrow hot pads to cycle through the possible weapons until the weapon you wish to place is displayed or press the Enter key while over a currently placed weapon to *copy* that weapon.**
2. **Move the cursor over one of the nine pylons on the undercarriage of the A-10. The cursor will change to the selected weapon when over pylons that the weapon can be placed on.**
3. **Press the Spacebar to place the weapon.**

Weapon Placement

There are nine pylons located on the undercarriage of the A-10. The program will automatically determine if the currently selected pylon can be loaded with the selected weapon. If a weapon can be placed on a selected pylon, the cursor shape will change to the currently selected weapon.

The following diagram illustrates the valid weapon placement choices for each of the A-10's pylons.



Chaff, Flare and Avenger Load

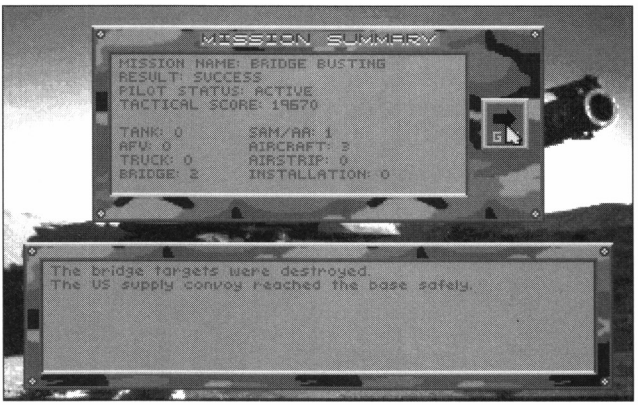
The load selection of chaff, flare and Avenger ammo is automatic. You will always receive a load of 30 chaff, 30 flares and 1350 rounds of ammo for the Avenger 30 mm cannon.

Counter Balancing

Placing an LGB or a bracket on pylons 3, 4, 6 or 7 will automatically place the same load on the opposite pylon to counter balance the load.

Mission Summary

Mission Summary

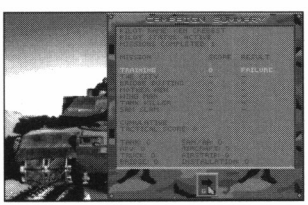


After each mission debriefing, you will receive a Mission Summary. Mission summaries contain all data on your latest performance. You will be given the overall result of the mission and your tactical score (a point system based on the number and type of kills).

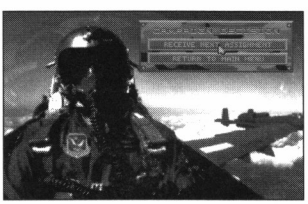
Campaign Summary

In Campaign Mode, you will receive both a Mission Summary and a Campaign Summary. The Campaign Summary contains a cumulative tactical score (compiled from all missions played).

Following the Campaign Summary screen will be the Campaign Decision screen. At this point you can decide to **Receive Next Assignment** or **Return To Main Menu**. Choosing **Receive Next Assignment** will place you into the next mission of the campaign. Choosing **Return To Main Menu** will save your place in the current campaign and return you to the **Main Menu**. Once saved, a campaign can be restarted at any time from the **Continue Campaign** section of the **Main Menu**.



Campaign Summary

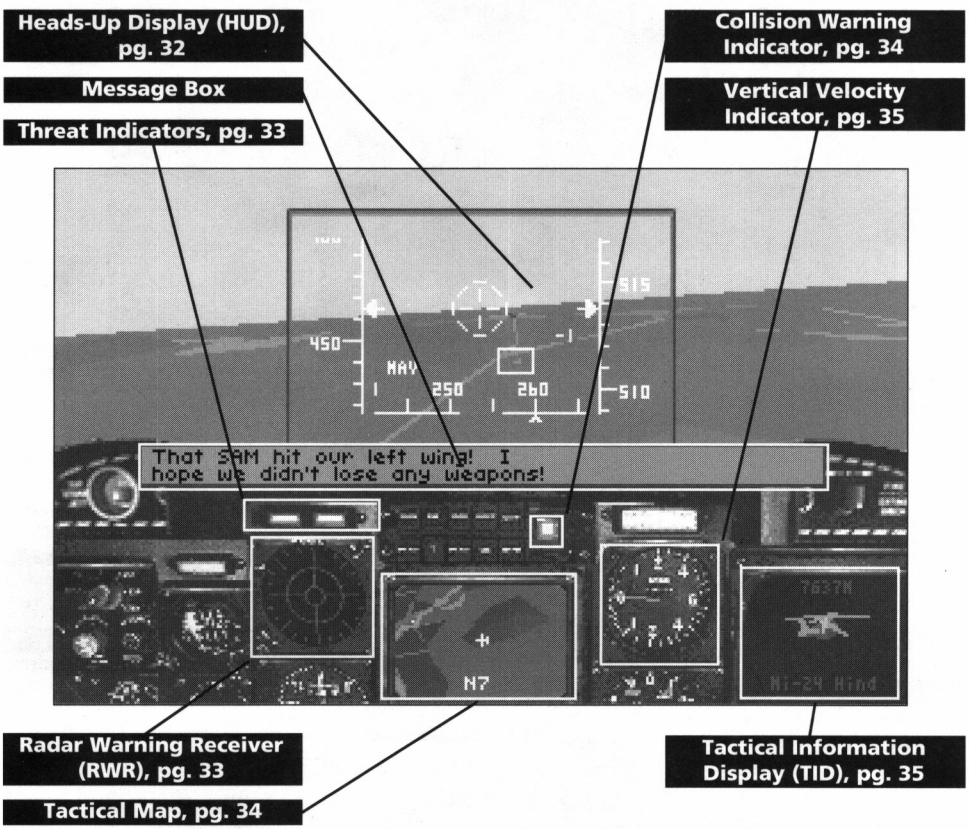


Campaign Decision

The Simulation

Every care has been taken to make the simulation of the A-10 Thunderbolt II as realistic as possible while not bogging the game down with complicated controls. What you get is a very accurate representation of the *feeling* of A-10 flight without the burden of intricate flight knowledge. Flying the A-10 is as simple as grabbing the joystick and throttling up. With the VCR Interface™, you are given complete control over 3-D definition, window size and mission difficulty levels. **(See VCR Interface™, page 40.)**

Cockpit Instruments



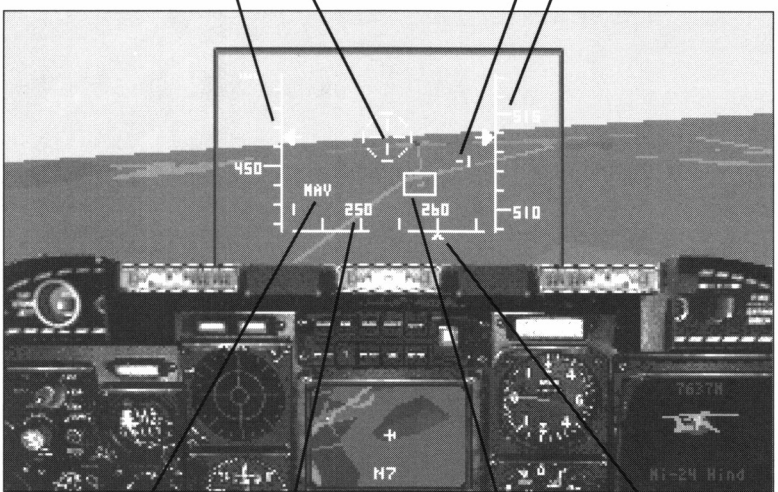
Heads-Up Display (HUD)

Gunsight
Position target within the cross-hairs to line up the GAU-8 Avenger cannon.

Airspeed Indicator
Displays airspeed in knots.

Pitch Indicator
Indicates the A-10's pitch in degrees.

Altimeter
Displays current altitude in feet.



Active Weapon
The active weapon display on the HUD indicates the currently selected weapon. (For information on Active Weapons **See Weapons Systems, page 45.**)

- **MAV** = AGM-65 Maverick
- **LGB** = Paveway LGB
- **ROC** = Rockeye II CBU
- **DUR** = Durandal
- **SID** = AIM 9L Sidewinder

Heading
Shows the A-10's current heading in degrees.

Destination Marker
Indicates direction to current destination. To find your way to the currently selected target on the Strategic Map, center the Destination Marker in the HUD and keep it there. (**See Strategic Map Icons, page 37.**)

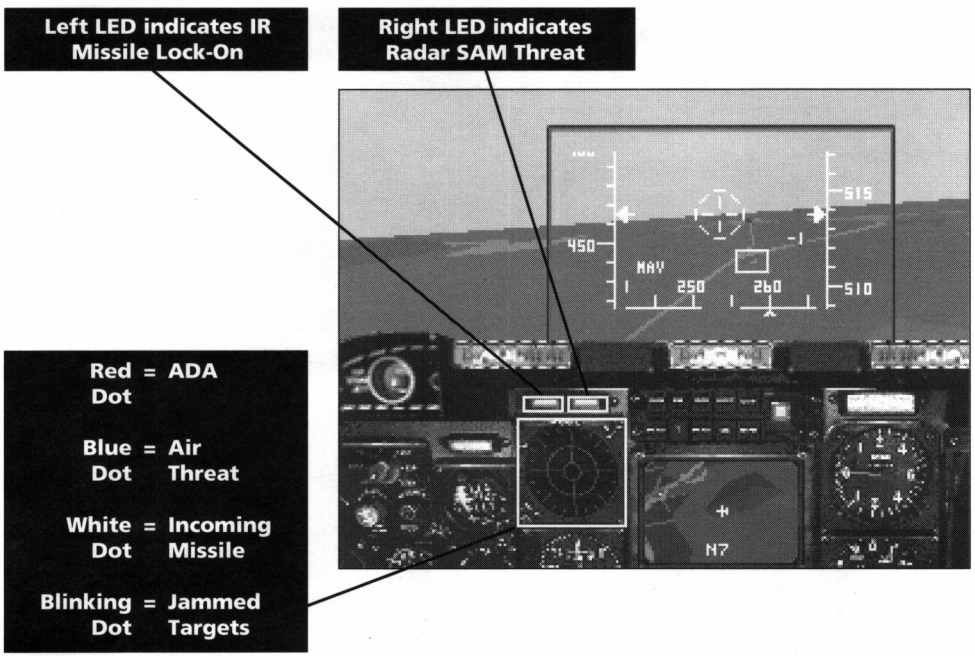
Target Box
Indicates current target for the Tactical Information Display (TID).

NOTE: FOR HEADING

NORTH is at 0° **SOUTH** is at 180° **EAST** is at 90° **WEST** is at 270°

Threat Indicators

This pair of LEDs mounted above the Radar Warning Receiver (RWR) warns the A-10 pilot when an infrared (IR) or radar-guided missile has locked on to his aircraft. The left LED indicates an IR missile has locked on to the A-10. The right LED indicates a radar SAM threat. **(See Defensive Weapons Systems, page 53.)**

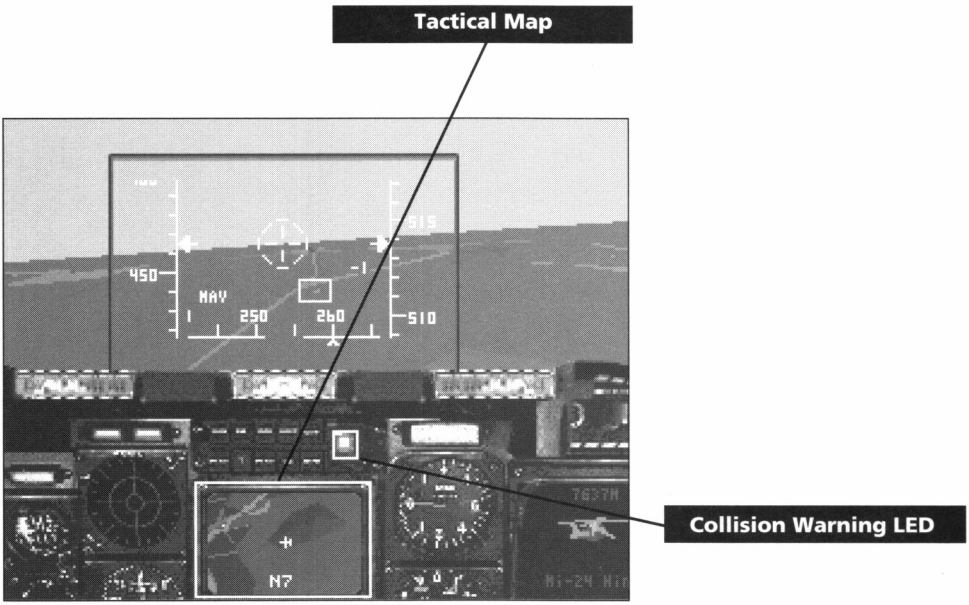


Radar Warning Receiver (RWR)

The RWR senses Air Defense Artillery (ADA), aircraft and missiles. A dot representing each of these threats is displayed on the RWR console. A red dot indicates an ADA threat, a blue dot represents an air threat and a white dot indicates an incoming missile. These dots blink when you have successfully jammed a target with the automatic jamming equipment (ECM Pod) which can be mounted standard on your A-10 Thunderbolt II. **(See Defensive Weapons Systems, page 53.)**

Tactical Map

The tactical map displays all terrain in a 40 km X 30 km area around the A-10. The A-10's current grid position is displayed at the bottom center of the tactical map.

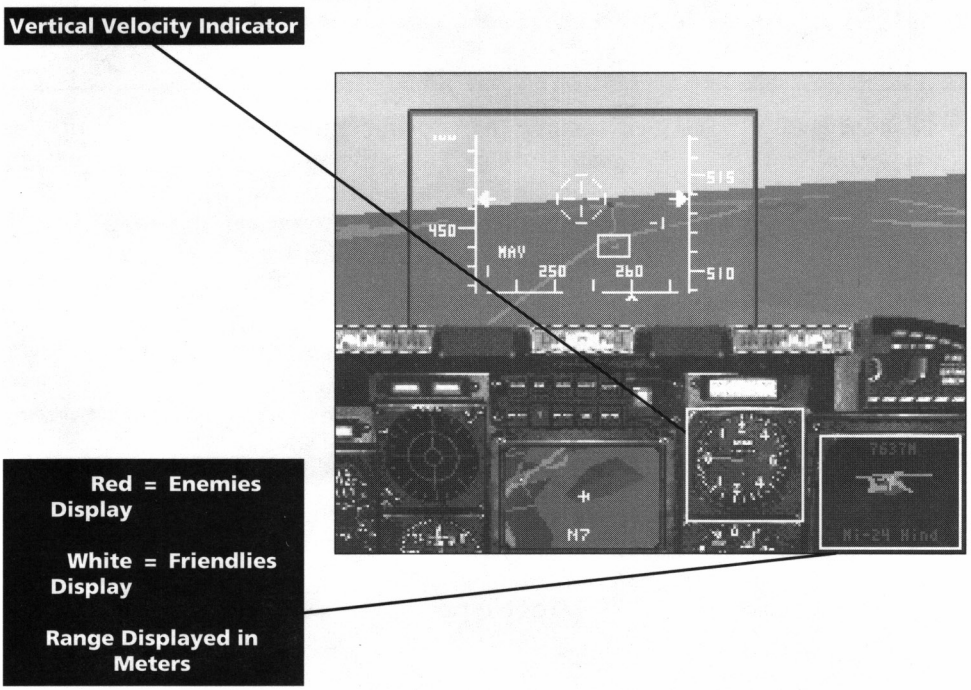


Collision Warning Indicator

This LED warns the pilot of an imminent crash into the ground.

Vertical Velocity Indicator

The Vertical Velocity Indicator gauge displays how quickly the A-10 is gaining or losing altitude. It points directly to the left in level flight.



Tactical Information Display (TID)

The TID displays the current target that the Weapons System is locked onto. If a weapon is fired, it will engage the displayed target. The TID provides target range, target identification and IFF (Identify Friend or Foe) information with hostile targets displayed in red text and friendly targets displayed in white text. **(See Vehicle Descriptions, page 48.)**

IMPORTANT!
Always check the TID before firing! Wasting friendlies isn't usually considered a good thing.

Simulation Systems

Along with the main cockpit and its instruments, there are several screens and menus that are available from the simulation mode that will prove very beneficial to a successful mission. **(See Game Overview, page 20.)**

Strategic Map

Pressing "**M**" during the simulation brings up the Strategic Map. This is the main source of information on the flow of the battle during the course of each mission. Each target shown on the map can be selected by cycling the current target box until it is placed over the desired target. Cycling of the target box can be done in two ways:

1) By depressing the arrow hot pads in the lower right corner of the screen.

2) By clicking on the desired target with the on-screen cursor using a mouse.

Once a target is selected, the Strategic Map will provide a description of the designated target. This description includes:

- Target Type
- Target Location (in Grid Coordinates)
- Target Heading
- Target's Estimated Speed
- Target's Bearing relative to the A-10's current position
- Target's Distance relative to the A-10's current postion
- Intelligence Reports (if any) on the target.

All enemy targets are displayed in RED while friendly units are shown in BLUE.

Strategic Map Icons

The Strategic Map uses several different icons to represent a variety of targets. The following is a listing of all icons used and their meanings.

ADA (air defense artillery)

Ground unit, artillery, convoy

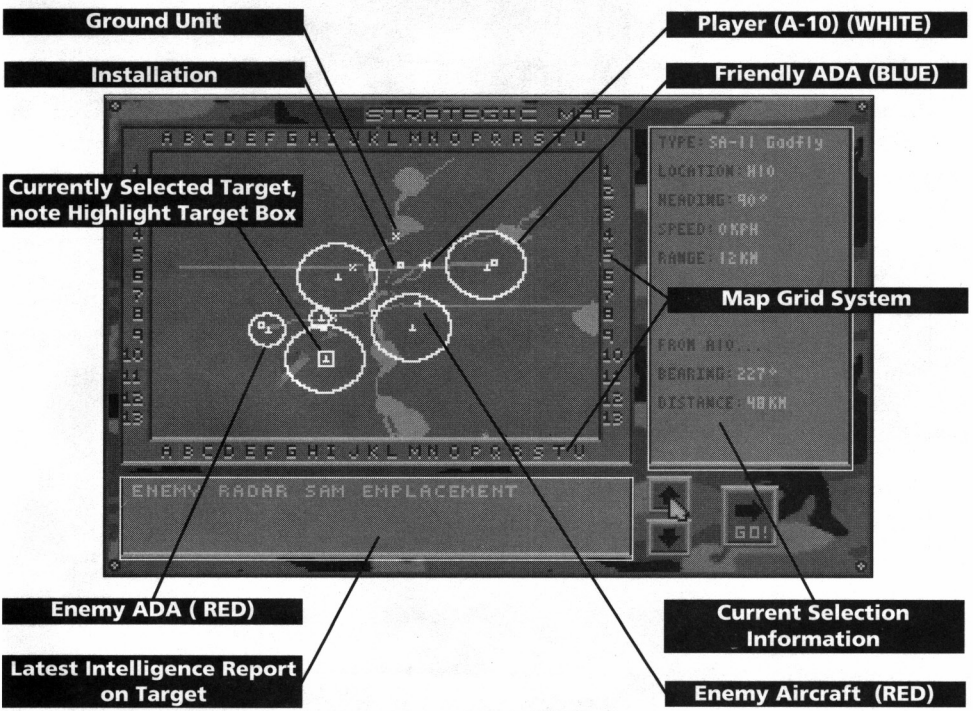
Installation (base, bridge, building)

Player (A-10)

Aircraft (helicopter or plane)

Truck convoy

IMPORTANT:
The currently selected target becomes a directional guide for the Destination Marker on the HUD. Following the Destination Marker will lead directly to the last target selected on the Strategic Map. **(See Destination Marker under HUD, page 32.)**

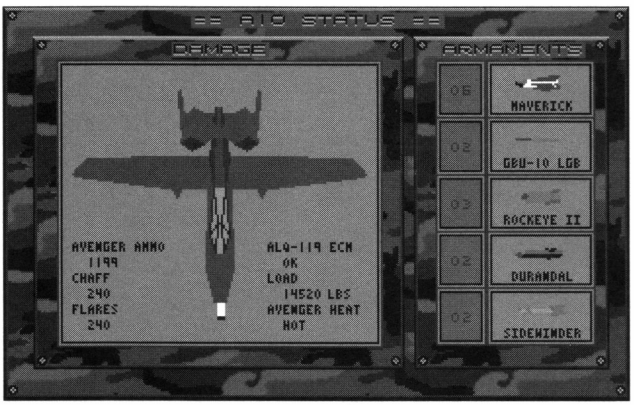


NOTE: Pressing "R" in the Strategic Map toggles the display of the ADA ranges on and off. **(See Additional Controls, page 17.)**

Status Screen

Pressing "**S**" brings up the A-10 Status Screen. This screen graphically displays the amount of damage sustained by the A-10 and shows its remaining armaments, gun ammunition, chaff and flare salvos. The weapon load weight and Avenger heat status are also displayed. (**See Weapons Systems, page 45.**)

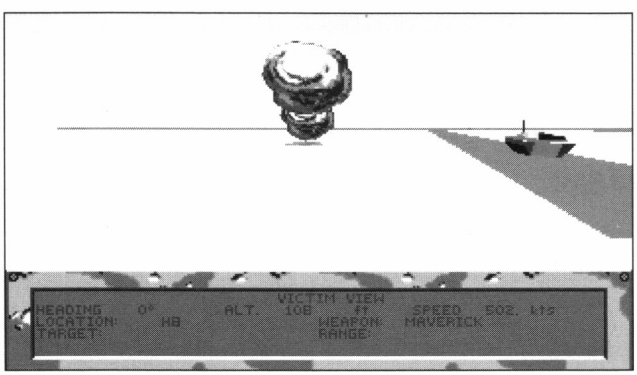
IMPORTANT:
If the A-10 loses a wing, all the weapons on that wing are lost.



Preset Views

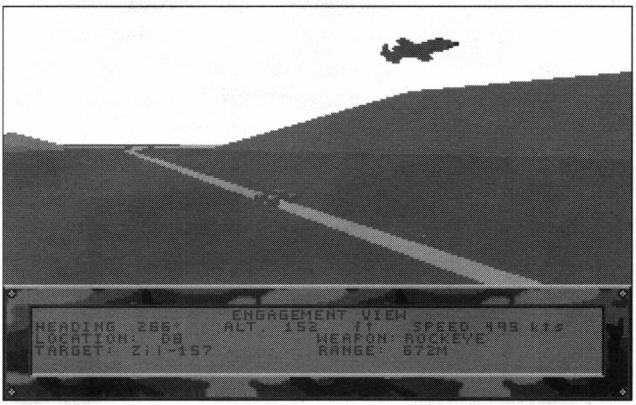
Along with three internal cockpit views, A-10 Tank Killer is capable of displaying 6 preset external views, including Victim and Engagement Views. (**See View Commands, page 18.**)

Victim View is an external camera that moves to constantly keep a fired weapon and its target in view.

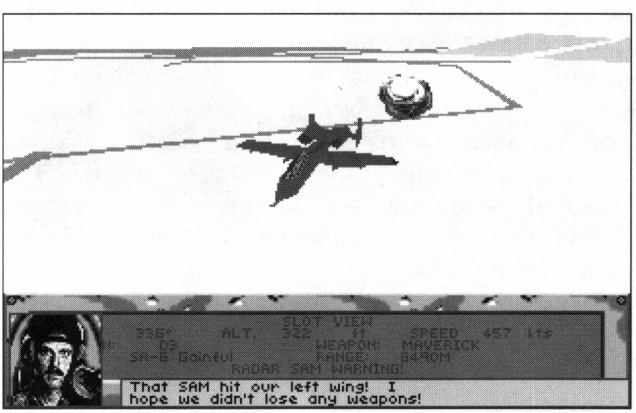


A Maverick destroys an enemy target as seen from Victim View

Engagement View is an external camera that pans to keep both the enemy and the A-10 in view.



Along with preset views is the Floating Camera Mode of viewing. When activated, the view is user controlled, allowing the use of joystick, keyboard or mouse for "live" movement inside and outside of the A-10. The Floating Camera Mode can be activated from the keyboard or from the Control menu. **(See Floating Camera Views, page 18.)**



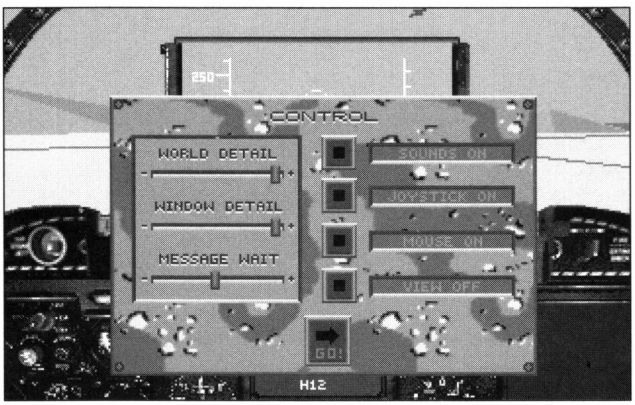
Floating Camera Mode

Floating Camera Mode
From the keyboard:
Pressing Alt-V toggles on/off

From the Control menu:
Press F10 from the simulation and select View On/View Off.

VCR Interface™

In a constant effort to make our games more enjoyable and less frustrating, we have developed a new type of game control called the VCR Interface™. In essence, the VCR Interface™ is a menu that allows you to control vital elements of game play. The interface will have different appearances in different games but the function will always be the same:



To give the user as much control as possible over game functions and flow. In A-10 Tank Killer, the VCR Interface™ is seen in two places. The interface is accessible while in the **Mission Select** menu and in the **Control** menu (above). In the **Mission Select** menu it allows you to customize the difficulty of each mission. In the **Control** menu, it gives you in-game control over the many simulation elements including: detail of the 3-D world, the size of the viewing window, the length of time that messages are displayed on screen, sound on/off, choice of input devices and Floating Camera on/off. The **Control** menu can be accessed at any time by simply pressing the "**F10**" key. (**See Additional Controls, page 17, also Menu Controls, page 22.**)

World and Window Detail Slider Bars

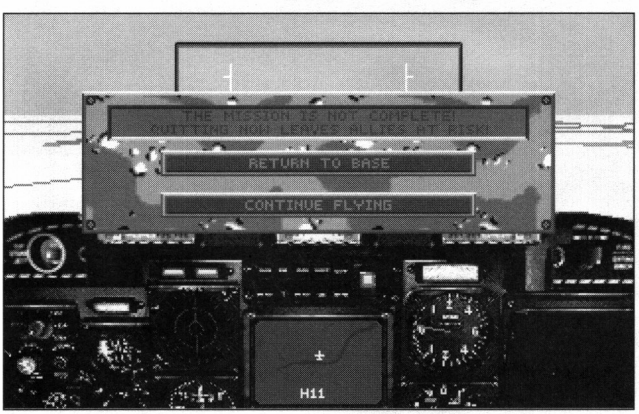
What they do: Because A-10 Tank Killer uses a highly advanced 3-Dimensional modeling system called 3Space™, older computers may have some difficulty handling the complex mathematical equations that are necessary to drive the detailed 3-D worlds. The Detail Slider Bars allow you to customize the detail of the game to fit the speed of your computer. By using the Slider Bars, you can "adjust" the amount of detail in the cockpit or in the 3-D world. **(See Menu Controls, page 22.)**

NOTE:
Whenever any of the Simulation System screens are called up, the game is paused.

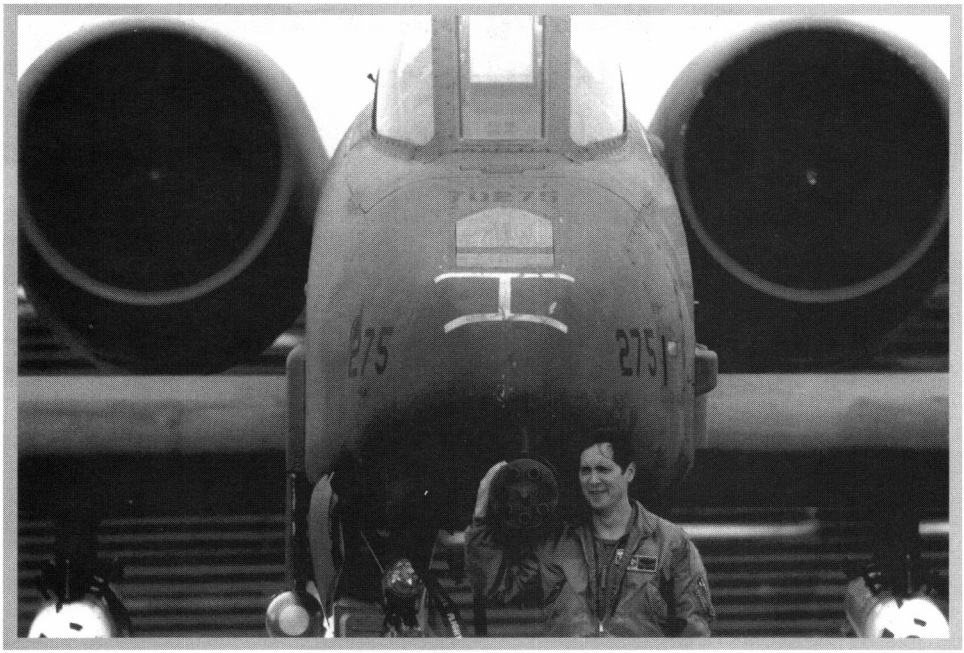
The Quit Menu

At any time during game play, if the "**ESC**" key is pressed the **Quit** menu will appear. This menu presents you with two options: **Return To Base** or **Continue Flying.**

Selecting **Return To Base** will place you directly into your Mission Debriefing. Selecting **Continue Flying** will re-enter the simulation.



IMPORTANT:
There are two ways to quit the simulation: with the Battle Complete or Incomplete. Quitting an Incomplete mission will leave any remaining Allied troops open to attack. If this happens your mission evaluation may suffer. **(See Mission Summary, page 30.)**



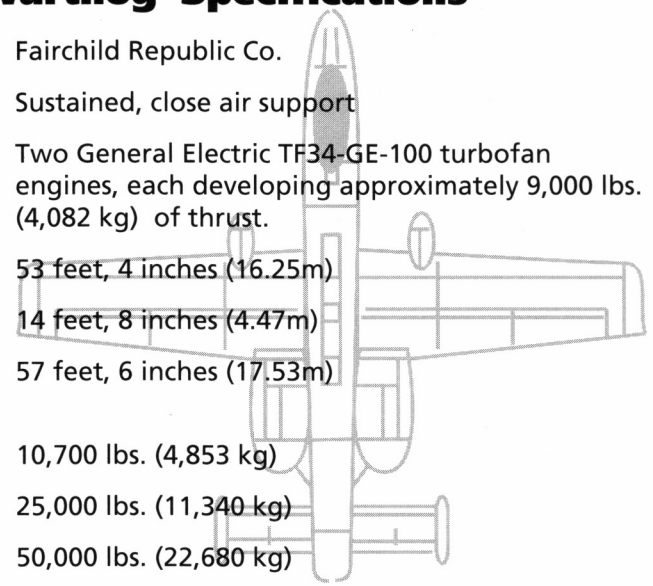
Captain Bob "Bo Bo" Swain

Andy Clark/Bettman Archive

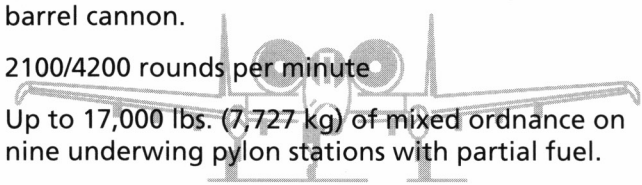
Lt. Heironimus

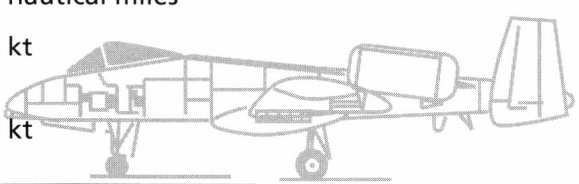
A-10 Pilot's Manual

A-10 Warthog Specifications



Manufacturer:	Fairchild Republic Co.
Primary Mission:	Sustained, close air support
Powerplant:	Two General Electric TF34-GE-100 turbofan engines, each developing approximately 9,000 lbs. (4,082 kg) of thrust.
Length:	53 feet, 4 inches (16.25m)
Height:	14 feet, 8 inches (4.47m)
Wingspan:	57 feet, 6 inches (17.53m)
Internal Fuel Capacity:	10,700 lbs. (4,853 kg)
Operating Weight:	25,000 lbs. (11,340 kg)
Max Gross Weight:	50,000 lbs. (22,680 kg)
Ammunition Capacity:	1,350 rounds: mixed HE and depleted uranium
Armament:	One 30mm General Electric GAU-8 Avenger seven barrel cannon.
Firing Rate:	2100/4200 rounds per minute
Ordnance Capacity:	Up to 17,000 lbs. (7,727 kg) of mixed ordnance on nine underwing pylon stations with partial fuel.
Ferry Range:	2,173 nautical miles (4,026 km)
Combat Radius with Typical Weapon Load:	250 nautical miles
Max Speed (clean):	450 kt
Combat Speed with Typical Weapon Load:	380 kt





OVERVIEW OF THE A-10 AND ITS ROLE

The A-10 is a close air support attack aircraft. It assists ground troops by eliminating threats such as hostile tanks, tank destroyers, and other armor. Its extensive weapon load enables it to take out larger targets such as bridges, airstrips and buildings.

In Vietnam it was found that an aircraft must be able to survive severe concentrations of anti-aircraft (AA) fire. The A-10 is built with redundant structural parts so that it can take a lot of damage. In fact, an A-10 can fly with one engine and half a wing blown off! The engines are placed high on the aircraft to protect them from AA fire. The bathtub of armor around the cockpit can withstand 23mm rounds.

The most striking feature of the A-10 is its 30mm cannon, the Avenger. It fires shells the size of milk bottles at a rate of 4,200 rounds per minute! The shells can rip through the armor of any tank in service.

WEAPONS SYSTEMS

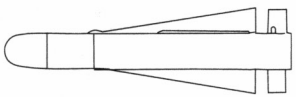
Avenger 30mm Cannon

Effective against: **TANKS, VEHICLES**

The GAU-8 "Avenger" is the most powerful gun ever mounted on an aircraft. It can fire 2.5 lb. depleted uranium shells at a rate of 4,200 rounds per minute into a target 4,000 feet away with 80% accuracy. The energy of these rounds fired is enough to rip through the armor of any Main Battle Tank currently in service.
WARNING: Continuously firing the Avenger cannon for extended periods of time will cause the gun to overheat and jam. You will be forced to wait for the gun to cool down before it becomes operational.

Anything that moves on the battlefield can be annihilated by the firepower of this awesome weapon.

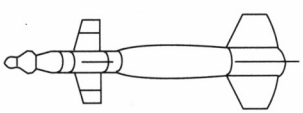
Maverick
MAV



Effective against: **TANKS, VEHICLES**

The Hughes Aircraft AGM-65D IIR (Imaging InfraRed) Maverick is a fire-and-forget air-to-ground missile system capable of engaging targets at ranges of up to five miles under ideal conditions. The Maverick's infrared heat-seeker locks on to the heat emitted by the target vehicle. This enables it to home in on a target without guidance from the aircraft once it is launched. The Maverick's armor-piercing warhead can vaporize the armor of any tank currently fielded by the Warsaw Pact. Operationally, the Maverick is a very lethal system, obtaining an 85% kill probability in weapons trials. Any vehicle or grounded aircraft can be taken out with Mavericks.

Paveway Laser Guided Bomb
LGB



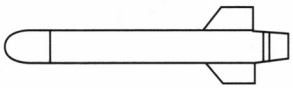
Effective against: **BRIDGES, BUNKERS, BUILDINGS, INSTALLATIONS**

Another precision munition carried by the A-10 is the Texas Instruments GBU-10E Paveway II Mk 84 laser-guided 2,000 lb. bomb. The Paveway is basically an "iron bomb" with a laser-seeker and control surfaces added. A typical attack profile is as follows: The pilot locks on to a target illuminated by a ground or air-based laser using the A-10's Pave Penny acquisition pod. Then he releases the weapon which glides to the target on its own, making mid-flight corrections as needed. Paveway is most effective against hard targets such as bridges, hardened aircraft revetments and large buildings.

Effective against: **VEHICLES**

Honeywell Mk 20 Rockeye II Cluster Bomb

ROC

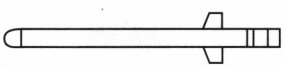


Despite the addition of a laser seeker on the newest versions, Rockeye is not considered a precision munition. The Rockeye relies on the "scatter effect" of up to 150 armor-piercing and high-explosive bomblets to destroy its target. Anything within its lethal radius (about 500 feet) is certain to be damaged, and stands a fair chance of being totally destroyed. The Rockeye is most effective against lightly armored vehicles (BRDM-3s, ACRVs, mobile SAM launchers, grounded aircraft), but a lucky hit can kill a tank.

Effective against: **AIRSTRIPS**

Matra Durandal Anti-Runway Penetration Bomb

DUR

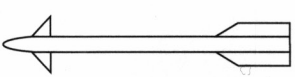


The Durandal is a very specialized weapon that is devastatingly effective against certain types of ground targets. It consists of a large HE (High Explosive) warhead encased in a steel jacket attached to a rocket engine. After launch, the ordnance releases a drag chute and falls until it is pointing straight down. Then the rocket motor fires, driving the Durandal deep into the target where it detonates. This explosion causes a huge "heave effect" which can shatter reinforced concrete and make a runway unusable with a single hit.

Effective against: **AIRCRAFT**

AIM 9L Sidewinder

SID



The AIM 9L Sidewinder is an air-to-air heat-seeking missile with all-aspect tracking capability. This enables the missile to lock onto an enemy plane even if it's nose-to-nose with the A-10. The effective range for a Sidewinder is approximately five miles.

VEHICLE DESCRIPTIONS

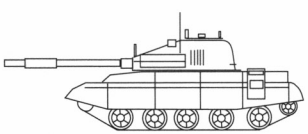
Hostile Units

(See Tactical Information Display, page 35.)

T-72, T-80 Main Battle Tank

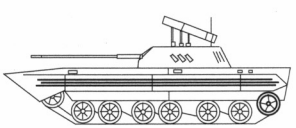
Primary armament: 125mm cannon
Top speed: 60km/h
Threat to the A-10: none
The T-80 is a threat to anything on the ground. Its powerful 125mm cannon can take out other tanks, tank destroyers, SAM launchers, and buildings. The Avenger and Mavericks are the best way to attack it, although a Rockeye will sometimes destroy it. The A-10 Tank Killer was designed to take out tanks like the T-80.

T-55, T-62 Main Battle Tank



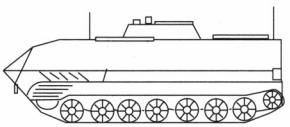
Primary armament: 105mm cannon
Top speed: 50 km/h
Threat to the A-10: none
The T-55 and T-62 are the inferior predecessors of the T-72. These aging tanks are hopelessly vulnerable to the A-10. Engage them with the Avenger, a Rockeye or a Maverick.

BMP Infantry Fighting Vehicle



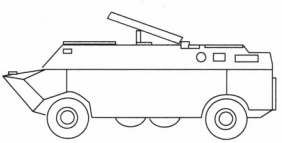
Primary armament: 30mm cannon
Top speed: 63 km/h
Threat to the A-10: none
The BMP is a lightly armored, tracked vehicle. It is designed to carry troops on the battlefield. Its small cannon allows it to engage lightly armored vehicles like trucks, but it's no match for a tank. Engage it with the Avenger, a Rockeye or a Maverick.

ACRV-2 Command Vehicle



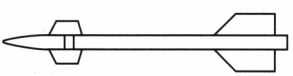
Primary armament: none
Top speed: 58 km/h
Threat to the A-10: none
The ACRV-2 is lightly armored, tracked vehicle designed to serve as a mobile command post. It is virtually unarmed. Engage it with the Avenger, a Maverick or a Rockeye.

BRDM-3 Tank Destroyer



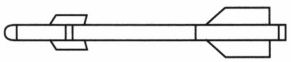
Primary armament: anti-tank missile
Top speed: 90 km/h
Threat to the A-10: none
The BRDM-3 presents a great threat to any friendly tanks. Its weapon range is greater than that of the M-1A1 Abrams. Engage it with the Avenger, a Maverick or a Rockeye.

SA-6 Gainful SA-11 Gadfly SAM Launchers



Primary armament: surface-to-air radar-guided missiles
Top speed: 58 km/h
Threat to the A-10: great
The SA-6 and SA-11 are mobile surface-to-air missile launchers. The missiles track the A-10 with a radar guidance system. The system can sometimes be fooled by dropping chaff which distract the missile away from the A-10. The missiles do great damage to the A-10. The SA-11 has a much greater range than the SA-6. Engaging a SAM launcher with the A-10 is dangerous, but can be done with the Avenger, a Maverick or a Rockeye. (For more information **See Defensive Weapons Systems, page 53** and **Tactics Against ADA, page 59.**)

SA-9 Gaskin
SA-13 Gopher
SAM Launchers



Primary armament: surface-to-air infrared-homing missiles
Top speed: 90 km/h
Threat to the A-10: great
The SA-9 and SA-13 are mobile surface-to-air missile launchers. The missiles home-in on the A-10 with an infrared heat-seeking system. They can sometimes be distracted by dropping a flare. These systems have a smaller range than their radar-guided counterparts (the SA-6 and SA-11). Engaging a SAM launcher with the A-10 is dangerous, but can be done with the Avenger, a Maverick or a Rockeye. (For more information **See Defensive Weapons Systems, page 53** and **Defensive Tactics Against ADA, page 59.**)

G-5 Howitzer

Primary armament: 155mm cannon
Threat to the A-10: none
The South African built G-5 boasts an extremely accurate 155mm cannon with a range of up to 24 miles — much greater than any of its allied counterparts.

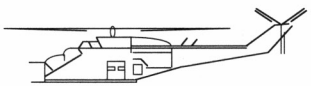
Mobile Scud Launcher

Primary armament: Scud missiles
Top speed: 90 km/h
Threat to the A-10: none
The Soviet built Scud missile was modified by the Iraqis to provide a much greater range. Its inaccuracy makes it more a terrorist than a military threat.

ZSU-23-4 Shilka AA Gun

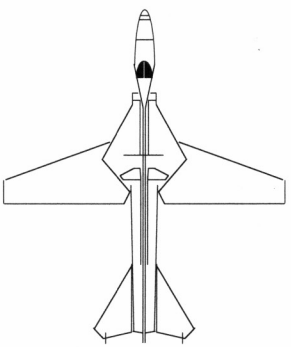
Primary armament: four 23mm guns
Top speed: 44 km/h
Threat to the A-10: great
The ZSU-23-4 is a devastating low-level anti-aircraft system. It's equipped with fire-control and target-acquisition radar to aim the four 23mm guns.

Mi-24 Hind Assault Helicopter



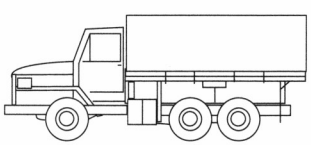
Primary armament: 23mm cannon
Top speed: 170 knots
Threat to the A-10: none
The Hind is a fast assault helicopter. It presents a great danger to your friendly ground forces. It is particularly effective against the M-1A1 Abrams. It can be engaged with a Sidewinder, and skilled A-10 pilots can shoot it down with the Avenger.

MiG-27 Flogger Strike Fighter



Primary armament: A variety of weapons mounted under the fuselage, including anti-aircraft missiles and bombs.
Top speed: 980 knots
Threat to the A-10: great
The Flogger can engage anything on the battlefield or in the air. Its air-to-air missiles pose a serious threat to the A-10. It can be engaged with a Sidewinder, and a lucky Avenger shot could damage it.

Zil-157 Truck

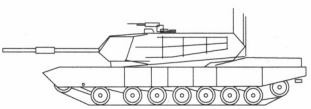


Primary armament: none
Top speed: 90 km/h
Threat to the A-10: none
The Zil-157 is the standard Soviet truck. It is used to transport troops, supplies, ammunition and equipment.

VEHICLE DESCRIPTIONS

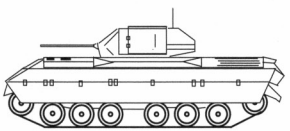
Friendlies

M-1A1 Abrams Main Battle Tank



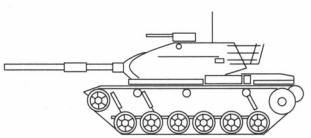
Primary armament: 120mm cannon
Top speed: 70 km/h
The M-1A1 Abrams is effective against most ground targets. The A-10 should provide close air support for the M-1A1, especially when there are tank destroyers or Hind helicopters in the area.

M2 Bradley Infantry Fighting Vehicle



Primary armament: 25mm chaingun
Top speed: 65 km/h
The M2 is the U.S. counterpart of the BMP-2. It can engage lightly armored targets, but should avoid one-on-one confrontations with tanks.

M-60 Main Battle Tank



Primary armament: 105mm cannon
Top speed: 48 km/h
This vintage U.S. Main Battle Tank was retrofitted with reactive armor for the Gulf crisis. Now primarily used by the Marine Corps, it also equips Saudi and Egyptian units.

M48 Chaparral SAM Launcher

Primary armament: surface-to-air infrared-homing missiles
Top speed: 60 km/h
The M48 is the standard air defense weapon system of the U.S. It can take out Hind helicopters and MiG-27 Floggers. When the A-10 is threatened by a MiG, ducking beneath the "umbrella" of an M48 is a smart move.

Structures such as these can be engaged with the Paveway LGB. However, before dropping an LGB on one, make sure that the mission objectives call for it to be destroyed. Taking out a bridge which U.S. forces plan on crossing is not a smart tactic.

Bridges, Buildings, Supply Dumps, Bases, etc.

Airstrips controlled by the enemy can be destroyed with the Durandal.

Airstrips

Farms are considered neutral civilian targets, and should not be attacked.

Farms

DEFENSIVE WEAPONS SYSTEMS

ALQ-119 ECM Jamming Pod: This pod hangs on the outside pylon of the A-10. It has jammers which can temporarily confuse the radar-acquisition on ADA systems. This gives the A-10 pilot a little extra time before hostile radar systems can lock on to the A-10. Jammed ADA systems are indicated by a blinking dot on the RWR.

Flare: This is a small heat-emitting decoy that the A-10 pilot can release. It will sometimes fool an incoming infrared-homing SAM or air-to-air missile into tracking it instead of the A-10. It's useful against the SA-9, SA-13 and MiG-27 Flogger.

Chaff: This is a cartridge which releases a cloud of small tin-foil strips. The cloud will reflect enemy radar and blind it for a few seconds. This sometimes gives the A-10 enough time to escape incoming radar-guided ADA systems (such as the SA-6, SA-11 and ZSU-23-4).

(See Radar Warning Receiver, page 33.)

FLIGHT INSTRUCTIONS

(See Controls, pg. 16)

The Takeoff

In most of the missions you will start off on the runway. Taking off is simple: Give the A-10 full throttle, and pull back on the stick. When you have enough speed, you'll lift off. Once safely off the ground, press the **G** key to raise the landing gear. With less than full throttle, you may run out of runway. Even this is rarely fatal. Recently an A-10 of the 81st Tactical Fighter Wing missed its takeoff and crashed into a beet field. The A-10 sustained very little damage.

Landing

It is not necessary to land the A-10. You may quit anytime by pressing **ESC**. This will end the mission and return you to base safely. If you want to experience landing, line up about 4000 meters from the runway, flying parallel to and toward the runway. Use the rudder to make small adjustments to your heading to get lined up exactly and press **G** to lower the landing gear. Bring your throttle down to 3. Come to an altitude of about 100 feet and guide the A-10 in. Once you set down, bring your throttle down to 1.

Taxiing

If you land and the mission isn't over, you'll want to takeoff again. To do this, you'll need to turn the A-10 around so you have enough runway. To taxi use a little throttle. For convenience, you can guide the A-10 on the ground with the rudder or aileron controls.

Flight

Aircraft are guided by control surfaces on the wings and tail, and by the amount of thrust generated by the engines. Ailerons on the wings control the roll of the A-10 and, indirectly, the heading. The tail controls the pitch and the rudder controls the heading.

FLIGHT INSTRUCTIONS

(See Controls, pg 16)

Climbing and Diving

To gain altitude, go into a climb. Just pull back on the stick until the A-10 is oriented upward (positive pitch). Continue climbing until you reach the altitude you want. A dive is just the opposite: Push forward on the stick to lose altitude.

Turning

There are several ways to execute a turn. The simplest way to turn is to move the stick left (or right). This will bank the A-10 slightly and will begin a turn. The more you bank, the more the A-10 will turn. When you've almost reached the heading you want, level-off the A-10.

A faster turn can be executed by moving the stick to the left (or right), then pulling it back. This is the fastest way to change heading. However, it's very easy to overshoot the heading you want, and unless the A-10 was rolled exactly 90 degrees, you also changed your pitch.

Small adjustments to the heading can be made with the rudder. Using the rudder is the slowest way to turn, but it doesn't affect the pitch and it's the most precise. Usually you'll want to start a turn by moving the stick left (or right), get close to the heading you want, level off the A-10, and then make the final adjustments to heading with the rudder.

Speed and Stalls

Speed is controlled by the throttle. Full throttle, full speed. A stall happens when the plane is moving through the air too slowly. Lift is lost and the control surfaces don't work properly. The A-10 will nose down until the airspeed is greater than the stall speed. To avoid stalls, keep the throttle at 4 or higher. Don't stall at low altitude unless you enjoy crashing.

COMBAT TACTICS

Finding the Target

The A-10 is a special kind of aircraft — a combat aircraft armed to the teeth.

Find the target you want on the Strategic Map, and then select it **(see page 37)**. The selected target will be highlighted on the map by a black square. The information display on the right will give you the bearing and distance of the target from your current position.

Return to the front cockpit view (**F1**). The destination indicator above the compass tape on the HUD will guide you to the target **(see page 32)**. Change your heading until the destination indicator (a small triangle) is centered on the tape. You are now heading directly toward the target. Stay low and go full throttle to reach the target. When you get near the target, it should appear on the TID screen. **(See page 35.)**

Attack Tactics

When you're about 7000 meters from the target, slow down to attack speed — a throttle setting of 4 or 5. This will give you enough time to line up on the target.

Select the proper weapon type to use against the target

Against Tanks: Select a **MAV**erick, **ROC**keye cluster bomb or use the Avenger 30mm cannon.

Against Other Vehicles: Select **MAV**erick, **ROC**keye cluster bomb (especially if there are several vehicles close together) or use the Avenger cannon.

Against Bridges, Bunkers, Buildings, or Installations: Select **LGB**.

Against Airstrips: Select **DUR**andal.

Against Aircraft: Select **SID**ewinder.

An Avenger Attack Run

The Avenger is an unguided weapon, it is mounted inside the fuselage of the A-10. You must position the sight over the target and fire. To set up a run, stay low (about 150 feet) and come in at slow speed. Line up on the target (use the rudder to get lined up exactly). Stay lined up, and, at about 3000m, pitch the plane so that the cross hairs are exactly over the target. Fire!

If there are several targets before you, use the rudder to spread the Avenger fire across them. Often you can eliminate an entire tank platoon in seconds!

Another useful tactic to score a hit is "Walking the Fire" across the target. When the cross hairs are below the target, begin firing. Pull the impact point of the shells across the target by pulling back on the stick.

If you miss some of the targets on the first run, make a second pass. Fly past the targets at full throttle for about seven seconds. Throttle back down to a slower speed, and wheel the A-10 about with either a quick turn or a loop and half-roll. Line up again and finish off the targets!

Other Weapons

The other weapons are easier to score a hit with. Keep the target in the HUD. Sequence through all the targets on the HUD until the one you want is displayed in the TID and is selected on the HUD. Make sure the proper weapon type is selected. When the target is within range, "LOCKED" will appear on the HUD next to the weapon type. To see the full force of the attack, switch to one of the cinematic views (**F8** or **F9**). (**See page 18.**)

The LGB and Rockeye are guided bombs, whereas the Maverick and Sidewinder are missiles. With the LGB and Rockeye, the lock-on range is smaller.

Avenger vs. Maverick

Both weapons have the same purpose: to kill tanks. You'll have to decide which to use on each attack run. The Maverick is easier to use. Select the target you want on the TID, wait for "LOCKED," and fire. The guidance system will ensure the Maverick hits the target. The Maverick has a greater range than the Avenger cannon. However, you have fewer Mavericks than Avenger bursts.

If you pop up over a hill and there's a SAM launcher staring at you, it's better to take it out with the Avenger. Avenger shells are faster than a Maverick, and in quick draws like this the Avenger comes out on top. Trying to quick-draw on a SAM with a Maverick is risky at best.

The Avenger is the most cost effective way to kill tanks. An Avenger burst costs a fraction of what a Maverick missile is worth.

Dogfights

Although the A-10 was not designed for dogfighting, A-10 pilots do not consider MiGs an unconquerable threat. At high altitudes the A-10 is at a distinct disadvantage, but at low altitudes a MiG has a hard time maneuvering.

When you spot a MiG, keep him in front of you. If you have a Sidewinder, fire it as soon as you achieve lock-on. At close range, you can try to hit the MiG with an Avenger burst — but this is very difficult. If you're out of Sidewinders, mister you're in trouble. Your best chance is to stay low, drop flares when necessary, and run toward the "umbrella" of a friendly SAM launcher. If the MiG follows you into the "umbrella," there's a good chance it will be shot down.

The A-10 can clean up against Hind helicopters. The Hind was not designed for air-to-air combat. You can use Sidewinders against a Hind, or use the

Avenger. The Hind is much slower than a MiG, and, with practice, a good pilot can take out a Hind quickly with the Avenger.

Defensive Tactics Against ADA

Stay low. The lower you fly, the greater the chance that the terrain will hide you from SAM launchers. Use the Strategic Map to stay outside the range of SAM launchers. Monitor the RWR to see what SAM threats are out there.

When a SAM is coming at you, there are some tactics to try. If there's a hill nearby, duck behind it. If the SAM is radar guided (indicated by the far right light above the blinking RWR), drop some chaff to distract it. If it has infrared homing (indicated by the far left light above the blinking RWR), drop a flare or two. As a last resort, attempt to out-turn the SAM. This is very difficult. If you find yourself in a quick draw with a SAM launcher, you can try and take it out with the Avenger before it launches.

Against a ZSU, you have to rely on the fact that your weapons have a greater range than the ZSU. Once you are locked on to the target, fire and get out of there fast! If you accidentally fly within the range of a ZSU, you're in trouble. They are lethal weapons and it's very difficult to evade their fire.

MISSION PLAN

In the briefing your commander will let you know what your mission objectives and priorities are. Once you're in the A-10, review the Strategic Map. It will familiarize you with the battle. Make a Flight Plan. However, due to the dynamic nature of land battles, you'll probably have to alter your Flight Plan several times. You will be receiving new orders and distress calls over the radio during the mission. Stay alert and stay flexible. Always keep your objectives in mind.

A-10 Pilot Interview

What tactics are employed when a SAM is launched at the A-10?
"In the first place, stay low to avoid SAM operators from acquiring the A-10. Once a SAM is launched, make a 3-D breakaway from the SAM. Additionally, flares can be dropped to decoy IR seeking missiles, and chaff is used on radar guided missiles."

What tactics are used when an enemy fighter, say a MiG, is spotted?
"Keep him in front of you. Don't let him on your tail. You can engage the fighter with Sidewinders. Two Sidewinders can be loaded on either outside pylon. The gun, although not very effective in shooting down aircraft, is very effective in making the enemy fighter take a defensive stance."

In actual combat, how low would you fly?
"Between 100 and 400 feet."

What's the role of the A-10?
"Close air support, we call it CAS. We support ground troops in close proximity, which is defined as operating within 1000 yards of friendly forces."

What's the difference between the role of the A-10, and the role of an attack helicopter?
"The roles are identical. Both aircraft provide close air support. However, the capabilities of an attack helicopter are different."

In what way?
"Hiding for example. A helicopter hides by hovering low behind some trees, or by actually landing in an open field. The A-10, since it must keep moving, would hide by flying low behind a ridgeline or hill. Helicopters are not as survivable as the A-10. One or two hits on a helicopter will generally cripple it, whereas the A-10 was designed to take hits. In Vietnam, aircraft were hit quite a bit, so survivability was an important factor. Also, the A-10 can carry much more ordnance. Helicopters carry about 2000 lbs. The A-10 can carry 17,000 lbs."

The F-16 is a ground-attack aircraft. What's the difference between the A-10's role and the F-16's role?

"The F-16 is a fast aircraft. It is used for deep interdiction strikes into enemy territory — Taking out a bridge behind enemy lines, for example. It can get in, strike, and get out. The A-10 can fly much slower than the F-16. This is essential for close air support. A-10 pilots can operate in a dynamic environment, where targets are moving rapidly and are well camouflaged. An A-10 pilot can spot a ground unit, identify it, wheel about, and destroy it. An F-16 wouldn't even know it's there.

What would a typical mission consist of?

"In an actual war, say in Central Europe, an A-10 pilot would go out and fly low to a contact point. At the contact point, the pilot would talk to a ground commander, who might say 'Four enemy tanks were spotted in the open, moving south bound at xx coordinates, and traveling at a speed of y. You're cleared to go ahead and engage them.' The contact would also let the pilot know what SAM threats are in the area, and what friendlies he should expect to see."

What's it like to fire the gun?

"The gun is very loud. It shakes the entire aircraft. You never get used to it."

Historical Overview

Left to right: Lt. Heironimus, Lt. Le Blanc, Lt. Isenstadt,
Lt. Radovcich, Lt. Runkle

Left: Captain Eric "Fish" Salomonson, England AFB Louisianna 23rd TFW
Right: Captain John "Karl" Marks, England AFB Louisianna 23rd TFW

Ted Jackson

Historical Overview

Warthog Heaven

On January 17, 1991, in the predawn gloom over the Emirate of Kuwait, U.S. Air Force Capt. Tony "Mad Dog" Mattox guided his A-10 low over the desert, toward his target. A red, white and black mouthful of bared fangs stood out on the nose of the dark green aircraft. Mattox was a member of the 23rd Tactical Fighter Wing, a military descendant of the famous "Flying Tigers" of World War II.

"This is the most thrilling and satisfying thing, knowing I could have saved many, many lives."

1st Lt. Don Henry, wingman on the first A-10 destruction of an Iraqi Scud missile launcher

Four hours earlier and approximately 260 nautical miles to the northwest, the Gulf War had begun with a massive air strike on the Iraqi capital of Baghdad. The U.S.-led anti-Iraq alliance had decided that despite Saddam Hussein's advantage in numbers of tanks, artillery pieces and combat troops in the Kuwait Theater of Operations, the alliance held a decisive edge in the quality of its deployed forces. The homely but deadly "Warthog" that Mattox piloted was part of that edge.

Like much of the U.S. arsenal, the A-10 had been designed to fight the Soviet Bloc in Eastern Europe, based on lessons the Air Force learned against Soviet-built weapons in Vietnam. But in nearly 20 years, the Warthog had never fired a shot or dropped a bomb in anger; it had never attacked anything more threatening than a target on a gunnery range.

Now it was time to force Hussein out of the tiny nation he had invaded five months earlier. It was time for the A-10 to show what it could do.

Approaching low so that he seemed to appear out of nowhere, Mattox dropped a cluster bomb on an Iraqi troop concentration. In the resulting chaos, it is doubtful that the enemy troops cared that they

were on the losing side of the first combat mission by a Warthog.

"I was impressed with the numbers of troops he had down there," Mattox said of that first attack. *"But we'll fight until they want to go home."*

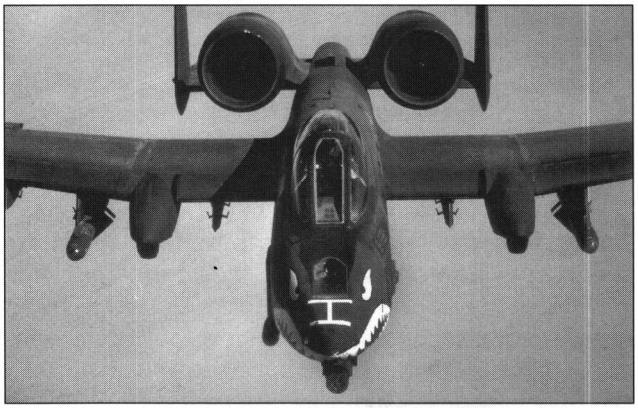
Designed as a tank killer, the A-10 was an obvious choice to go after Scud launchers.

Later that day, other A-10 pilots from the 23rd successfully bombed and strafed dug-in Iraqi tanks. The Iraqis fired anti-aircraft guns and surface-to-air missiles against the daylight raiders, but to no avail. The A-10s also hit Iraqi radar stations, and on January 18, they went after Scud launchers.

Hussein had used his Scud ballistic missiles against Israel and Saudi Arabia, firing them from mobile launchers and promising to fill their warheads with chemical agents. While not militarily effective because they were so inaccurate, the threat of chemical attack (a threat never carried out, thankfully) instantly made the Scuds much-feared weapons of terror.

Designed as a tank killer, the A-10 was an obvious choice to go after Scud launchers. On day two of the war, Capt. Mark Koechle and his wingman, 1st Lt. Don Henry, both members of the 23rd, were headed out from a forward base in Saudi Arabia when their radios crackled with the command to divert from their preplanned targets and head for coordinates in Iraq. Scud launchers had been detected.

As they approached the coordinates where they had been told to search, the two Warthog pilots found themselves flying through haze that often obscured the ground. They varied their altitude and search pattern, literally looking high and low for an opening in the haze that would reveal the launchers.



Mi Seitleman/Foto Consortium

Suddenly Koechle saw three faint outlines on the desert. Koechle and Henry went down for a closer look.

"As I rolled out, I could see what looked like three flatbed trucks in the desert," he told an Air Force journalist. *"I thought, well there's three and they look like Scuds to me."*

...already the A-10 had distinguished itself against virtually every type of important ground target in the combat theater.

The two pilots used bombs, Maverick missiles and their awesome GAU-8 Avenger 30mm Gatling guns to make short work of the launchers. Koechle took out two and Henry nailed the third. As far as the two pilots could tell, the Iraqi missile crews were so surprised that someone was shooting at them that they put up no defense.

As the two Scud-busters slipped back into the clouds to return to base, the Gulf War was barely one day old and already the A-10 had distinguished itself against virtually every type of important ground target in the combat theater.

The A-10, conceived during a jungle war and designed to fend off Soviet tanks in the forested hills of Germany, was finding that the Middle East desert was "Warthog Heaven."

The Case for CAS

The A-10 was designed to answer the call for a modern aircraft devoted to close air support. The need for such a weapon was painfully clear above the jungle battlefields of Vietnam.

Close air support, or CAS, is what an infantryman screams for when his light cavalry unit is being cut to pieces by a platoon of enemy battle tanks, or when his squad has been ambushed by a company of enemy troops.

To be effective, CAS must arrive quickly, be able to deliver devastating blows with pinpoint accuracy, and have the ability to loiter in the area without being shot down by enemy anti-aircraft guns or missiles. On the modern battlefield, CAS must be able to destroy hardened targets such as main battle tanks with a single pass.

Close air support is not the kind of strafing and bombing that's done before the ground battle to soften up the enemy. Some CAS aircraft, including the A-10, can be used for such missions, but their real reason for being is to support friendly troops *while they are engaged in combat* with nearby enemy troops and armor. It is one of the hairiest missions any combat pilot can encounter.

During most of the Vietnam War, the Air Force's only aircraft dedicated to close air support was the single-engine, propeller-driven A-1 Skyraider, better known as the Sandy. Tough, slow (240 knots or nautical miles per hour, with a weapons load), and highly maneuverable, it was often effective against jungle targets. But it was vulnerable to increasingly accurate anti-aircraft guns and it lacked a weapon that could consistently knock out heavy armor.

Luckily, the enemy in Vietnam seldom used heavy

"We would be in serious trouble if the A-10's hadn't come. They are the major weapons between us and the Iraqis."

U.S. Army officer at the front in the Gulf War, quoted by columnist Jack Anderson

armor. When they did and the Air Force responded, even the successful missions illustrated the desperate need for an aircraft better-suited to killing tanks. Such was the case on May 6, 1972, near the My Chanh River in South Vietnam, when a prowling flight of three F-4D Phantom fighter-bombers destroyed four or five late-model Russian-built tanks of the North Vietnamese Army.

The tanks had been shelling U.S. and South Vietnamese positions by night and hiding by day and the brass wanted them taken out. A flight of Navy A-4 Skyhawks had spotted the tanks and attacked them, but could not destroy them. When the Navy fliers headed back to their carrier, the Phantoms rolled in for a try, each armed with eight Mark 82 Snakeye high-drag 500-pound bombs and four BLU-27 800-pound napalm canisters.

The tanks tried to hide in a tree-line, but their tracks gave away their position, and a canister of napalm sent them scurrying into the open.

"They made a run across a field of green, newly-planted rice," recalled then-Maj. Robert "Moose" Miller, a backseater in one of the Phantoms. The tanks were going top speed, sending up rooster tails of mud and water. *"They were boogeyin' out of there, just hauling, and we just went bonkers."*

"We really nailed it," Miller said. *"Pieces of tank flew way out across the paddy."*

On his first pass, Miller's aircraft commander, Hal "Festus" May, managed to destroy one tank with a direct bomb hit.

"We really nailed it," Miller said. *"Pieces of tank flew way out across the paddy."*

To hit a moving tank from a Phantom with a high-drag bomb took equal measures of skill and luck. The other Phantoms also scored a hit or two, but

pretty soon all three F-4s were out of bombs and there were still tanks charging across the rice paddies. The only weapons left were the 20mm M-61 Vulcan Gatling guns, which are still standard in most fighter jets, and the napalm.

"We strafed one of them and that didn't do any good," Miller said. The rounds were ineffective against the armor, and the Phantom had to fly so low to hit the tank that the aircraft was in danger of being struck by ricocheting rounds and pieces of equipment that had been shot off the tank.

Finally, with dense clouds of smoke nearly causing a mid-air collision with another Phantom and with fuel getting low, May managed to slide one of the giant napalm canisters into a tank, where it detonated in a huge fireball. The tank continued across the paddy for awhile, suddenly turned at a right angle and stopped as the shells inside it started exploding.

The Phantoms had knocked out four or five of the tanks, and the aircrews were decorated for their efforts, but it had been a dangerously chaotic attack. The jets had made repeated passes, and if the tanks had been even moderately well-defended with anti-aircraft emplacements the attack would probably have failed. The Phantom fliers had demonstrated in 1972 what supporters of a new CAS aircraft had known in 1965 — nothing in the Air Force inventory was ideal for the job of destroying armor. Something was needed, an airborne weapons platform that was both efficiently lethal and remarkably tough. It was already in the works.

Something was needed, an airborne weapons platform that was both efficiently lethal and remarkably tough.

In 1966, spurred on by the Army which threatened to buy a new CAS aircraft of its own if the flyboys didn't come up with one, the Air Force had launched the Attack Experimental (A-X) program. Its goal was

to write performance requirements for a new generation of CAS aircraft. Four years later, in 1970, the aircraft industry received a request for proposals. The new airplane would have to fly at 400 knots per hour, be highly maneuverable, and be able to carry at least 9500 pounds of weapons on its wings and cannon rounds in its magazine. With such a load it would be expected to fly to a target at least 250 knots away, loiter in the combat area for two hours and return to base. It would have no sophisticated navigation systems and no terrain-following radar, but instead would rely on the pilot's proficiency and its own nimbleness to hug the terrain and avoid enemy fire.

It would have no sophisticated navigation systems and no terrain-following radar, but instead would rely on the pilot's proficiency and its own nimbleness to hug the terrain and avoid enemy fire.

It was a tall order indeed, but there was more. The new attack plane would have to survive more battle damage than any modern aircraft. It would have to be extremely easy to maintain. It would have to be well-suited in every way to deployment at primitive air bases close to the front so it could respond quickly when called.

Along with these requirements, the Air Force also dictated that the new aircraft would carry the most powerful machine gun ever placed in an attack plane. It would fire 30mm rounds at a rate of at least 4000 per minute, and would have a muzzle velocity of at least 3500 feet per second...so fast that the

rounds would be able to penetrate any known or foreseen tank armor. The specifications dictated that it would have to be a Gatling-type gun, with several revolving barrels, and that it would have to be huge — about the length and weight of a 1970 Cadillac. Clearly this would be an amazing weapon, and the aircraft designed to carry it into battle must be equally amazing.

The new aircraft would carry the most powerful machine gun ever placed in an attack plane.

In 1973, after the customary competitions with fly-offs and shoot-offs between hopeful manufacturers, the Fairchild Republic Co. was awarded the contract to build the A-10 at its Farmingdale, Long Island plant. A few months later General Electric got the nod to build the A-10's 20-foot long, 4000 pound GAU-8 Avenger Gatling gun. The Air Force would soon have an aircraft that would answer the prayers of combat infantryman.

Ted Jackson

"Mr. A-10"

About the same time the A-10 became the Air Force's choice as the new CAS aircraft, it also got its less-than-flattering nickname. Elliot Kazan remembers it well. An aeronautical engineer and a former vice president of the now defunct Fairchild Republic Co., he was director of the A-10 project from the beginning. He now works for Grumman, which owns the maintenance and parts contracts for the A-10. In the A-10 community he is often referred to simply as "Mr. A-10."

"The Air Force had provided a very detailed set of specifications," Kazan said of the design. *"It should be highly maneuverable. It should be protected everywhere. And it should carry a whole shopping list of weapons."*

Fairchild had gambled that it would get the contract, and the production line was cranking out airplanes by 1975. However, it was three years before the A-10 got its official name.

"The Air Force had provided a very detailed set of specifications," Kazan said of the design. *"It should be highly maneuverable. It should be protected everywhere. And it should carry a whole shopping list of weapons."*

"There was a contest, as there always is to name a new airplane," Kazan said. Republic had built the P-47 Thunderbolt of World War II fame, the F-84 Thunderjet and the F-105 Thunderchief, which saw service over Vietnam. The A-10 would officially be christened the Thunderbolt II, but it would never stick. Republic's "Thunder" names had never stuck. The P-47 was called the "Jug," the F-84 was called the "Hog" and the F-105 was called the "Thud." As soon as the Air Force pilot community set eyes on the pugnacious, ungainly-looking A-10, inspiration struck.

"They kept saying, 'Geez, that thing looks ugly,' " Kazan recalled. *"And then somebody remembered that they have these ugly, mean animals called warthogs, and it just stuck."*

It stuck to the point where a general order came down, forbidding the use of the name. The pilots, of course, ignored the order, and the A-10 became the Warthog.

Today, Kazan concedes that the name fits the A-10. Like its namesake, the airplane is thick-skinned, not very pretty and pretty darned mean.

"Of course, being the manufacturer, we never would have called it anything like that," he added.

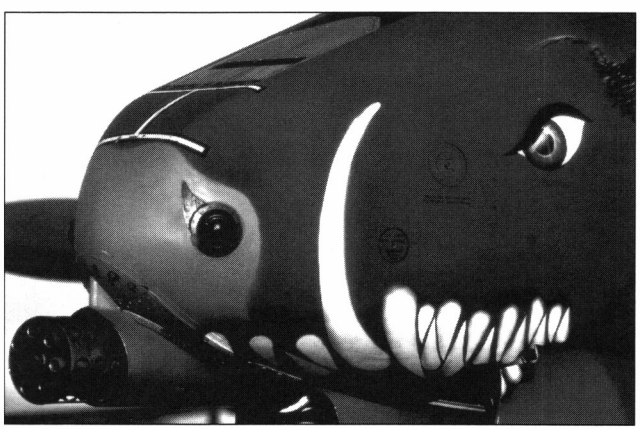
Over the years, as it became obvious that the men who flew the A-10 had a genuine affection for it, it became easier for Fairchild to accept the nickname.

Pilots liked the A-10 "because it's a pilot's airplane," Kazan said. Most state-of-the-art jet fighters are flown by computers. The pilot moves the stick to tell the computer where he wants the airplane to go, the computer determines the best way to do that and sends messages to the various complex flight systems. The A-10 does it the old-fashioned way.

"The A-10," Kazan said, *"is flown by the pilot."*

"They kept saying, 'Geez, that thing looks ugly.' And then somebody remembered that they have these ugly, mean animals called warthogs, and it just stuck."

Elliot Kazan, A-10 project director



Mi Seitleman/Foto Consortium

The Timex Tank Killer

"It's basically a '57 Buick with a gun in it."

A-10 pilot quoted in the book, *Gunsmoke*

If ever an aircraft was designed to live up to the famous watch company slogan that it could "take a licking and keeping on ticking," that aircraft is the A-10. Everything about the Warthog is designed with toughness in mind. Designers estimated that fully 14 percent of the weight of the Warthog was due to protection features.

Perhaps the primary example is the "bathtub of titanium" which surrounds the cockpit up to the canopy. Made of metal slabs between 1/2 inch and 1-1/2 inches thick, it weighs 1200 pounds and can deflect most known anti-aircraft rounds.

Statistically, though, the cockpit armor is not the most significant protection system on the A-10. Research from the Vietnam War and from Arab-Israeli conflicts revealed that 62 percent of fighter jet losses were due to fuel system damage; 18 percent to incapacitation of the pilot; 10 percent to damage to the flight controls; 7 percent to loss of engine power; and 3 percent to structural damage.

The A-10's fuel system is as well-protected as any combat aircraft's. Most of the fuel is carried in self-sealing tanks high in the fuselage, above the wing, where they are protected from ground fire. There are small internal tanks close in on each wing, and drop tanks can also be carried for added range. The fuel in these tanks is used first and is usually gone long before the A-10 reaches its combat area. The main tanks are filled with foam baffles designed to retard the spread of fire. Also, the main tanks are extremely close to the two turbofan engines, eliminating the need to run long, vulnerable fuel lines through the aircraft.

With the armor-plated cockpit, the only weak point in the protection of the pilot is the canopy itself and

it is designed to withstand many bullet strikes. A-10 pilots joke that because their plane is so slow — less than one third the top speed of the F-16 Falcon — even the rear of the A-10's canopy is reinforced...not against enemy fire but to withstand the impact of a bird overtaking the aircraft.

The flight control system is also well defended. Control lines are protected with ballistic foam, which won't stop a direct hit but does protect the lines from fragments. More importantly, the A-10 is the only fighter aircraft in the world with a full backup flight control system.

The A-10's two General Electric high-bypass turbofan engines are protected mostly by their location high on either side of the rear of the fuselage. When the Warthog is approaching a target, the powerplants are hidden by the wings, and when it's departing they're hidden by the tail assembly. This makes it hard to hit the engines with gunfire and difficult to lock on to their heat signature with infrared missiles. The fact that the engines are separated from each other also adds to system toughness. (Usually in a twin-engined fighter, the engines are side by side. If one powerplant takes a catastrophic hit, it destroys the other as it disintegrates.) The A-10's engines are far enough apart so that if one is hit and comes apart, the debris seldom damages the other engine. As with most twin-engined fighters, the A-10 can easily fly home on one engine.

A-10 pilots joke that because their plane is so slow — less than one third the top speed of the F-16 Falcon — even the rear of the A-10's canopy is reinforced...not against enemy fire but to withstand the impact of a bird overtaking the aircraft.

As for resilience to general structural damage, the A-10 is designed to fly with most of a wing, one of its twin tails and one of its engines completely shot off. The Warthog is anything but fragile.

A myriad of other toughness features are built into the A-10, but perhaps the landing gear is the best demonstration of how battlefield longevity was

The Warthog is anything but fragile.

added at every opportunity. It's a standard tricycle system, with one wheel on the nose and one on each wing. However, unlike most aircraft landing gear, the A-10's retract forward and extend rearward. This means that if the hydraulic gear-lowering system is shot up, the pilot can simply release the gear and let gravity and wind pressure lock the wheels into landing position.

To make more room for bombs on the wings, each main gear is tucked into its own pod, bolted forward and below the wing. About half of the wheel and tire protrude from the pod, meaning that even in a gear-up landing, the wheels bear most of the aircraft's weight and protect the Warthog from being destroyed.

Sgt. John Gray

Andy Clark/Bettman Archive

The Awesome Avenger

No aspect of the Warthog gets more attention than the GAU-8 gun around which the aircraft was designed.

The A-10 can carry most modern air-to-ground weapons and also the air-to-air Sidewinder infrared missile. But no aspect of the Warthog gets more attention than the GAU-8 gun around which the aircraft was designed. The Air Force wanted to put into the air a weapon that could economically destroy the toughest battle tank with a single pass.

Quickly it was determined that a 30mm round with enough weight and muzzle velocity could do the job. The rounds would be massive, nearly a foot long, with the heaviest antitank variant weighing in at about 2 pounds. To get the rate of fire the Air Force wanted, the gun would have to be a Gatling type, meaning it would have several rotating barrels (seven in the case of the GAU-8). The gun would have such a powerful kick (about 9000 pounds) that the firing barrel would have to be perfectly aligned with the aircraft's centerline as it fired, so that the recoil would not shift the aircraft off its target.

While much has been written about the enormous size of the weapon that resulted from these specifications — the gun and its drum occupies most of the front half of the aircraft — perhaps one minor maintenance requirement best illustrates the extent to which the gun dominates the Warthog's design. When the Avenger is removed from the Warthog for maintenance, the ground crew must first place a jack beneath the rear of the fuselage. Otherwise the A-10's nose would fly up as the aircraft came crashing down on its tail.

In use, the Avenger easily lives up to its specifications. Its most deadly round is the heaviest, which has a depleted uranium core that punctures a tank's armor and then ignites into a spray of hot metal. The muzzle velocity is so great that the round drops barely 10 feet in 4000 feet of travel.

"There's nothing more fun than firing that gun," said a veteran A-10 pilot. *"When those rounds are coming out of that gun at 70 rounds per second, it's almost like a continuous ray. It's almost like you're shooting a laser."*

A one-second burst from 4000 feet will put 40 rounds into an area about the size of a tank; six hits are considered a lethal dose. When fully loaded, an A-10 has about 20 seconds worth of ammunition at its top firing rate, so it's theoretically possible for a pilot to destroy 20 main battle tanks in a single mission.

The accuracy of the Avenger negates the need for complex sighting computers and displays in the cockpit. The pilot simply lines up the fixed dot on his heads-up display, pulls the trigger and watches the target disintegrate.

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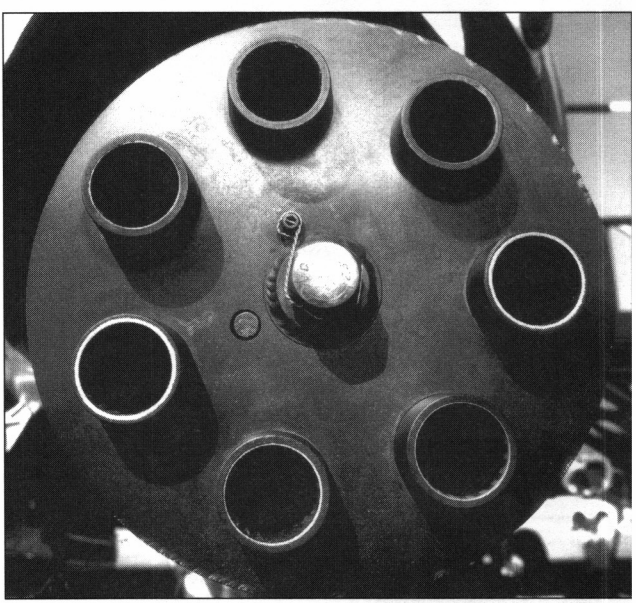


Mi Seitleman/Foto Consortium

Pilot's Delight

Col. Christopher Russo is an A-10 system program manager for the Air Force at McClellan Air Force Base in California. While the title may sound a bit bureaucratic, Russo is no pencil-pusher. He's flown the A-10, the T-38, the F-15, the F-16, the F-111 and the F-4 — the latter two in combat in Vietnam.

Despite its slowness and the fact that it doesn't have much of an air-to-air combat role, the Warthog is popular with pilots. Although Dynamix's simulation in "A-10 Tank Killer" features a copilot to allow for dialogue that makes the simulation more fun, all but a handful of Warthogs are single-seaters. That's one of the things pilots like most about them.

"What I've most frequently heard from experienced guys, guys like myself who've spent 20 or 25 years flying fighter airplanes, is that the reason the A-10 might be sought after by some of the younger guys coming out of pilot training is that it's absolutely the ideal platform for a guy to learn, in a fairly unsophisticated, uncomplex environment, how to be a good fighter pilot," Russo commented. *"Because it's such a forgiving airplane, it's such a simple airplane to fly, it's so easy to fly, and yet the biggest thrill in life for a lot of us pilots is for us to be single-seat.*

You are responsible for everything that goes on in that airplane and nobody's looking over your shoulder. That's really the ultimate in being a fighter pilot. In the old days it used to be single seat, single-engine, but now, just to get a single-seat cockpit, like an F-15, F-16, A-10, is where it's at in fighter airplanes.

The Warthog is a challenging assignment for any pilot," Russo stated.

> *"The Warthog is a challenging assignment for any pilot."*
>
> Col. Christopher Russo, veteran fighter pilot

"If you have learned how to master the A-10, you can go fly anything."

A guy can go in there with virtually no experience in fighters, and he's going to learn how to be a good wingman first, and then he's going to learn how to be a good leader. Then, if he's any good at all, he can be an instructor. And he's gonna learn how to fly low, and he's gonna learn how to talk to the Army, and he's gonna learn how to deal with all the other facets of flying fighter airplanes — refueling, air-to-air, air-to-ground, weapons delivery, firing Mavericks, firing rockets, shooting the biggest gun in anybody's inventory. You can learn all that, you can do it so easily, you can do it so effortlessly.

If he's any good at that, the transition from that experience into a high-performance F-15 or F-16 is a piece of cake. If you have learned how to master the A-10, you can go fly anything.

The only complaint that anybody ever has about it is that it's slow," Russo stated. A-10 pilots sometimes joke that while other fighter pilots check their airspeed on a machmeter to see how fast they're moving in relation to the speed of sound, Warthog drivers check their speed on a calendar.

"But once you go out and fly it, if you're flying down low to the ground, and doing 250 to 300 knots, that appears fast to you," Russo said.

A-10 pilots spend much of their time flying at treetop level without the benefit of sophisticated terrain-following radar such as the systems used in the F-111 and the Navy's A-6 Intruder. At such altitudes it requires incredible concentration to keep the Warthog from becoming part of the terrain.

"That's right," Russo declared. *"At 50 feet, if you sneeze, you could die."*

Besides being intellectually sharp, an A-10 pilot

must be in great physical shape to withstand the constant turning, climbing and diving he encounters in combat. And he might have to do it several times a day, because the A-10 is designed to be back in the air and ready for combat less than 30 minutes after completing a mission.

"Flying fighter airplanes is a very physically demanding activity," Russo commented. *"A lot of people don't realize that. It's physically demanding but you also have to stay mentally alert because you're only seconds away from the ground.*

It's thrilling, though. It's a lot of fun. And you find you recover quite quickly. What we typically used to do is what they call quick-turns, where you fly, you expend all your ordnance, you land, they pump you up with gas, put more bullets in the gun and then half an hour later you're taking off on your second mission. And during the time you're on the ground, you sort of recover. You stay in the cockpit and relax, you start breathing normally again, and then you get back to it."

Besides being intellectually sharp, an A-10 pilot must be in great physical shape to withstand the constant turning, climbing and diving he encounters in combat.

"There's nothing like firing the Avenger," he said, describing the sensation of watching a stream of bullets reach out to a target 4000 feet away.

"It rumbles," he said of the gun. *"It sort of rumbles. The funny thing is, when you're sitting in the cockpit, you're straddling the gun barrel. It's a flat cockpit floor, so your feet are just above it, so you can actually feel it rotating down there. You feel a slight buzz from the nose, and a little vibration throughout the airplane."*

The incredible recoil of the gun is equal to the thrust of one of the Warthog's engines, so what's to keep the Avenger's kick from slowing down the Warthog? *"It would,"* Russo said, *"except that you're putting*

the power up and pointing the nose down when you're shooting, so it doesn't really have a chance to slow it down. If you pulled the power back and had the airplane level and you fired it, yeah, you'd probably have a decrease in speed."

"They think they can sneak up on you, but you can turn around and be pointing your nose at 'em in a matter of seconds."

A-10 literature is full of stories of Warthog pilots who put the fear of the Avenger into pilots of vastly superior air-to-air fighters during war games. That's due to the amazing handling and firepower of the Warthog.

"It's wonderful," Russo declared. *"It'll go anywhere you point it. Extremely maneuverable, it has tremendous roll rates and tremendous turning rates. That's what surprises so many adversaries. They think they can sneak up on you, but you can turn around and be pointing your nose at 'em in a matter of seconds."*

Any adversary who knows what the GAU-8 can do and sees its seven barrels pointed his direction is going to do little more than try to escape.

Besides its firepower and maneuverability, the fact that the A-10 is in many ways a flying tank also endears it to its pilots. Although most modern fighter jets are incredibly lethal offensive weapons, they are also horribly vulnerable. They're so stuffed with critical components and fuel that pilots worry about one lucky round blowing them out of the sky. It happened time and again over Vietnam.

"That's exactly what was behind the way they built the A-10," said Russo. *"It'll take more than a lucky round. The only lucky round that'll kill an A-10 is one that goes through the forehead of the pilot. What they did when they built the airplane is they tested it. They took the airplane and they subjected it to typical Soviet weaponry. They got a couple of 37*

millimeter guns and they got some 23 millimeter and they got some small arms, and they fired at the airplane, and they assessed whether it would have seriously damaged the airplane.

What they found was that it could take a tremendous number of rounds and not be lost. It would still have enough systems left, that it could continue to operate."

"It allows you to fly the airplane when the hydraulics are gone, and it's the only fighter airplane in the world that can do that."

Russo noted that the A-10 has a unique redundant control system. In other fighters, if the hydraulics are shot up to the point where they don't work, the pilot usually has to eject immediately because he loses control of the aircraft. In the A-10 there's a backup system of old-fashioned cable controls.

"It allows you to fly the airplane when the hydraulics are gone, and it's the only fighter airplane in the world that can do that," stated Russo. *"Because of the huge airloads on the airplane, it takes a tremendous amount of strength to fly it, but the good news is, you can fly it out of enemy territory before you have to eject."*

If the Warthog is popular with pilots, it's even more of a favorite with the Army. While other Air Force planes can perform some of the CAS missions, they can also do so many other things that they might not be available for close air support when the Army calls.

"With the A-10, for the first time ever, we've got a plane that was built for, and is superbly able to do, close air support," Russo declared. *"Nothing else. For the Army, that's perfect, because the Army knows that if you get A-10's in-theater, they're gonna do close air support.*

Every A-10 pilot is a master of close air support. He

"It did absolutely everything it was supposed to do, and all the systems worked perfectly."

knows how to deal with any kind of Army situation. He knows how to recognize different artillery pieces, he knows how to recognize what's shaping up on the battlefield. He keeps oriented. Whereas another pilot flying another airplane, trying to do close air support in addition to his other missions, may not be quite as proficient."

Russo was still sorting out the details of the A-10's performance in the Gulf War, but he said the early assessment was extremely positive.

"It did absolutely everything it was supposed to do, and all the systems worked perfectly. A couple of systems that are backup systems to allow you to fly the airplane when it's heavily shot up, worked perfectly."

One A-10 returned to a base in Saudi Arabia with a huge hole in one of its wings, two of the four wing spars blown away, and one main landing gear all but gone. The pilot had to hold his control stick all the way to the left to keep the aircraft level, but he got back from a combat mission over Kuwait.

"It's true!" Russo said. *"And my engineers worked on it and put it back into flying shape, and it's flying again."*

Against the Iraqis' best tank, the Russian-built T-72, the A-10's gun *"did exactly what we thought it could do,"* Russo said. *"The trick is, you've got to hit it in the right place, and that's classified information. But everybody who flies an A-10 knows how to do that."*

Of all the pilots in the anti-Iraq alliance, the Warthog drivers were among the best-suited to fight above the confusing array of ground forces. A-10 pilots train all the time with NATO troops in Europe, so they're used to communicating with ground troops of different nations in potentially confusing situations.

Of all the challenges facing an A-10 pilot, one of the toughest is communications.

"One of the most difficult things to do is keep track of all the radios," Russo stated. *"It's got about three radios, and you can get calls in on any of the three. You've got to be able to recognize where the calls are coming from and be able to answer them. With the Army and your wingman and your headquarters and everybody else, it can be very confusing. It can get very hectic."*

Of all the pilots in the anti-Iraq alliance, the Warthog drivers were among the best-suited to fight above the confusing array of ground forces.

George Hall

Called to Fight

"I take back all the bad things I've ever said about the A-10s. I love them."

Lt. Gen. Charles Horner, in charge of the Central Command Air Forces in the Gulf War, quoted by Jack Anderson

August 1, 1990, Iraqi representatives pulled out of a meeting with Kuwaiti diplomats. The Iraqis stated that the Kuwaitis were responding unreasonably to Iraq's demand that Kuwait relinquish part of a disputed oil field and forgive much of the huge debt Iraq had built up during its eight-year war with Iran. The next day, Iraqi troops, tanks and aircraft stormed into the tiny nation. Some Kuwaiti troops escaped into Saudi Arabia, and a few Kuwaiti fighter pilots taxied their jets out of their bombed-out air bases and took off from highways. But Kuwait's meager defenses were overwhelmed by the military might of Saddam Hussein.

U.S. President George Bush immediately called for an embargo against Iraq. The United Nations imposed an embargo on August 6. On August 7, Bush sent American fighter jets and combat troops to Saudi Arabia, telling Americans he had drawn "a line in the sand." The operation was called Desert Shield. For the next five months, troop concentrations built up on both sides as the anti-Iraq alliance was formed and Hussein reinforced his forces in Kuwait and southern Iraq. The diplomats continued to talk.

On November 8, Bush said he was doubling the number of U.S. troops in the region — to 400,000. Among the aircraft to be stationed in Saudi Arabia were approximately 120 A-10 Warthogs, despite worries by some Air Force officials that the planes would not fare well against Iraqi air defenses.

On November 29, the U.N. Security Council voted to allow the use of force to eject Iraq from Kuwait if the Iraqis didn't pull out by January 15, 1991.

On January 9, Iraqi and U.S. officials met in Geneva, Switzerland, to try to avert war, but the talks failed. On January 12, the U.S. Congress gave President

Bush authority to wage war on Iraq. After midnight on January 16, U.S. and Allied forces launched massive air strikes against Iraq. A-10s took off in the darkness bound for Kuwait, entering combat for the first time ever. Desert Shield became Desert Storm.

From the beginning, the A-10's main mission was simple. It was to reduce potential Allied casualties by destroying as much of Iraq's military hardware as possible. The Iraqis were believed to have more tanks, combat troops and artillery pieces in the combat theater than the Allies, and the Iraqis were dug-in in a formidable system of trenches and berms. Many of the tanks, for example, were parked in revetments so that only their guns and the tops of their turrets were clearly visible.

The A-10's main mission was simple. ...Reduce potential Allied casualties by destroying as much of Iraq's military hardware as possible.

The feeling among Allied strategists was that airpower could be the great equalizer. Air superiority fighters such as the F-15 Eagle and the F-14 Tomcat quickly established control, making the Iraqi Air Force a negligible threat. Strike aircraft such as F-15s, F-16 Falcons, F-111s and F-117s raided deep into Iraq, while aircraft such as the A-10 concentrated on forces closer to the front. Quickly the Warthog surfaced as one of the unlikely stars of the air war, as indicated in this dispatch to the *Air Force Times* newspaper:

"As sleeker fighters rocketed overhead to bomb targets inside Iraq, slow-moving A-10 Thunderbolt IIs methodically chewed up dozens of Iraqi tanks, armored personnel carriers and Scud missile launchers.

The 'Warthogs' — 'the red-headed stepchild of the Air Force' in the words of one U.S. aviator — took on a prominent role in the second week of the air campaign, helping repulse a column of 80 tanks and other armored vehicles that crossed into Saudi Arabia

in the biggest land battle of the war. A-10s also destroyed dozens of other vehicles in attacks on three Iraqi military convoys.

'We love this plane,' said one infantry commander of the snub-nosed, green tank killer. 'It comes in and smashes tanks, armored vehicles. It's the A-10's day in the sun.' "

In a January 29-30 battle, A-10s were credited with leading the counterattack that sent a four-pronged Iraqi offensive packing. U.S. Marine Capt. Bill Wainwright, who called in air strikes against the Iraqis, said he saw about 20 tanks and other vehicles destroyed, and that the A-10s got 70 percent of them.

In another article, *"Seeing the War From the Cockpit of a Deadly Warthog,"* Molly Moore of the *Washington Post* reported the comments of Col. Dave Sawyer, who hit his targets almost effortlessly on the first day of the war and thought, *"This is gonna be pretty much a turkey shoot."* Then, after clouds had obscured the target area for nearly a week, Sawyer returned to find the enemy hidden away.

"It comes in and smashes tanks, armored vehicles. It's the A-10's day in the sun. "

"He's buried a whole army out there," the colonel said of Saddam Hussein. *"When we're lucky we take out armor and tanks. On the other hand, anything you destroy decreases Iraq's ability to wage war."*

Sawyer, a Vietnam veteran, also told Moore how the Warthog drivers dealt with the emotions of combat.

"The time for apprehension and puking your guts out is before the mission," he said. *"Once you're in the cockpit, you put it out of your mind. It takes a lot of concentration — you have to think about hitting*

the target. Now on the way back, that's when you start shaking sometimes."

Although the A-10 is primarily a daylight fighter, at least one A-10 unit in the Gulf War specialized in night raids. It was the 355th Tactical Fighter Squadron, commanded by Lt. Col. Rick McDow. As reported by *Aviation Week* magazine, McDow's men experienced good success early in the war.

Since the A-10 has no built-in night vision equipment, pilots use the images seen by the infrared seekers located in the noses of their Maverick air-to-ground missiles when searching for targets at night. In the right circumstances they can even use the blurry infrared images to find targets for their Gatling guns.

One night, near al Wafra in southern Kuwait, the squadron attacked an armored column and destroyed 24 tanks.

As McDow described it, the A-10s usually flew with support by an F-4G Wild Weasel to jam enemy radar, and with OV-10s and OA-10s, the latter being the observation version of the A-10, calling in strikes. One night, near al Wafra in southern Kuwait, the squadron attacked an armored column and destroyed 24 tanks.

"It was a busy night and we were productive along with a lot of other systems," McDow told the reporter.

The A-10 also had one other significant mission in the Gulf War — that of close air support during helicopter rescues of downed allied pilots. It's a long tradition in the U.S. military to take extraordinary measures to keep downed colleagues from becoming prisoners of war, and the U.S. continued that tradition in the Gulf War. Like the pilots of the A-1 Sandy in Vietnam, A-10 pilots are trained to take command

of a rescue situation, helping with everything from locating the downed flier to providing cover and escort for the rescue chopper.

On January 28, as a downed and slightly injured pilot of an F-14 Tomcat signaled for help from deep within Iraq, two A-10s circled him and an MH-53 Pave Low helicopter approached. All was going according to plan until an Iraqi Army truck appeared, headed toward the downed American. Wasting no time, one of the A-10s swooped down and destroyed the truck with 30mm shells. The helicopter plucked away the pilot and the three aircraft headed for safety.

"It was a rather indescribable feeling to know that he was now on the helicopter, and we were coming out of enemy territory," said Capt. Paul Johnson, who led the rescue effort.

An Iraqi Army truck appeared, headed toward the downed American. Wasting no time, one of the A-10s swooped down and destroyed the truck with 30mm shells.

Among the many A-10 "firsts" scored in the Gulf War was the Warthog's first air-to-air kill, accomplished by U.S. Air Force Reserve Capt. Bob Swain, whose civilian job is flying 767s for USAir. Swain was on a typical combat mission over Kuwait on February 6, when he and his wingman spotted some Iraqi helicopters hovering near the ground. When one of them made a run for it, Swain gave chase.

Approaching the chopper, he tried in vain to lock-on a missile, then resorted to his gun.

"Some of the bullets ran through him," Swain said, *"but we weren't sure if it was stopped completely. I came back with the final pass, hit it and it fell apart. I shot about 300 bullets at him. That's a pretty good burst."*

Vindication

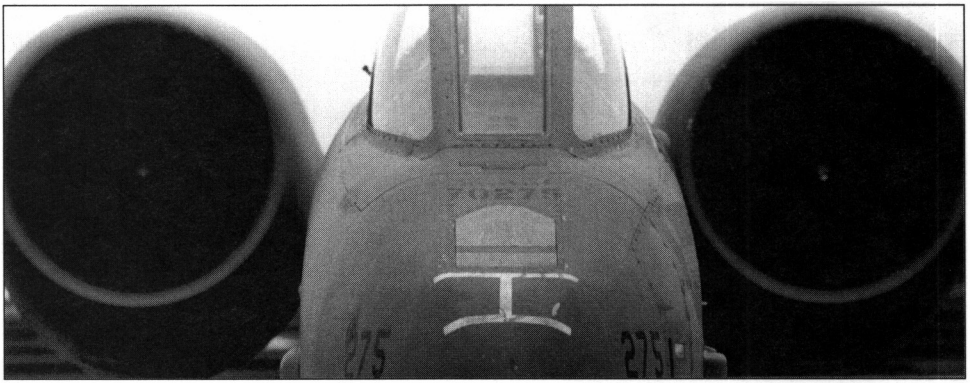
On February 23, after five weeks of withering air attacks on Iraqi positions, allied forces launched a huge ground assault into Kuwait and southern Iraq, supported by a dramatic surge in air strikes. Army commanders found what everyone had suspected but had been too cautious to assume — the air war had so reduced the Iraqis' ability and will to fight that the ground war would be little more than a mopping up exercise.

"It did everything they asked it to do and more."

As the remaining Iraqi armor broke from its defensive positions to attack or to withdraw toward Iraq, A-10s and other aircraft bore down on them, destroying the enemy in droves. On February 27, after barely 100 hours of ground combat, President Bush declared a cease-fire.

Allied losses were put at 126 dead. U.S. losses were 79 dead and 213 wounded. Iraqi casualties were estimated in the 100,000 range. The Iraqis' vaunted tank corps had been almost annihilated. Of approximately 4200 tanks that entered combat, an estimated 4000 were destroyed.

As the cease-fire held and the analysts swarmed in to determine why the Iraqis had been so soundly thrashed, much of the credit fell to the strategy of the Allied commander, U.S. Gen. Norman Schwarzkopf, and the fact that the Allies had apparently overestimated the quality of the Iraqi military. But the Gulf War also stood as a testimony to the true advantage of airpower in modern warfare, and to the effectiveness of a certain slow-moving attack plane that had appeared in at least one headline as the "U.S.'s flying tortoise."



Andy Clark/Bettman Archive

"It saved a lot of foot soldiers. It saved a lot of lives."

"Before the war, the A-10 was going to come out of service," said Elliot Kazan, lead engineer on the original A-10 project. *"Since then, that has been canceled. It did everything they asked it to do and more."*

"It makes you feel good," he said of the success of his favorite airplane. *"It saved a lot of foot soldiers. It saved a lot of lives."*

Pilot Notes

Pilot Notes

Pilot Notes

Pilot Notes

A-10: Tank Killer Main Team Front and Center (left to right) Supporting Cast Behind
Randy Dersham, Dave Selle, David McClurg, Lincoln Hutton, Damon Slye, Cyrus Kanga, Mark Brennemen, Kobi Miller, Bryce Morsello and Sher Alltucker
(special thanks to Atrium Security for making this illegal shot possible)

Over 25 of the industry's best programmers, artists and background crew worked together to bring this product to life. A great many all-nighters, far too many 16 hour days, several dozen delivered pizzas, numerous Tetris™ matches and at least one bunny roast later, this program finds it's way into your hands. We hope that you have as much fun playing this product as we had creating it.

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